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STATISTICAL SUMMARY OF MUNICIPAL WATER FACILITIES IN THE UNITED STATES JANUARY 1, 1958

Andrew C. Glass, et al

Public Health Service
Washington, D. C.

1963

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ACKNOWLEDGMENT

The basic data from which this summary was prepared were furnished as the Inventory of Municipal Water Facilities in the United States by the sanitary engineering staffs of the State health departments. It was through their tireless efforts and cooperation in the collection of this data, that this summary was made possible. Acknowledgment and appreciation is given to the statistical and clerical staff of the Water and Sewage Facilities Section whose careful and diligent work in preparing the tables herein presented, merits the highest praise.

INTRODUCTION

This report summarizes and analyzes data on community water supply and treatment facilities, based on the 1958 Inventory of Municipal Water Facilities (*1*). This is the third such study prepared by the Public Health Service (*2*, *3*). Comprehensive data are presented by States, community population size groups, and major drainage basins. Certain data of a statistical nature have been reproduced in this summary from the second study (*2*) for analytical and comparative purposes.

History

In 1939 the Public Health Service, in cooperation with the State health departments, initiated a comprehensive program in the compilation of water and sewage facilities statistics. Until 1950 this activity was conducted at the Environmental Health Center, Cincinnati, Ohio, and was then transferred to the Division of Water Supply and Pollution Control Washington, D.C.

During 1943 a tabulation of untreated water supplies was started to supplement those data already available and was published in 1948 (4). Annual revised editions were prepared for 1947 and 1948, but they were not published. (For a more complete discussion of Inventory Development see Supplement 213, Public Health Reports (*5*).)

A summary of the 1940 inventory data on water treatment plants has been published (*3*) and data on all public water supplies were compiled by *Engineering News-Record* in 1939 (*6*).

Over the years separate listings were developed, one for water supply facilities, the other for sewage and industrial waste facilities. Beginning in 1952 these data were requested from the State agencies responsible for water pollution control activities. While many States have produced annual revisions of the inventory beginning in 1953, the listings for the entire United States were not available until 1957.

During 1957 special forms (see figure 1) were distributed to the States in order to obtain the latest data on all communities having either municipally or privately owned water supplies. These data reflected the latest available information as of January 1, 1958. Reports as received from the various State agencies were edited and then embossed on metal addressograph plates. The inventories were printed using three-column listing equipment which extends lines of data listed vertically on the plates to a horizontal position on the forms. While plates are filed alphabetically within a State, the use of small metal tabs for coding permits the preparation of listings by population size groups, major drainage basins, treated or untreated supplies or other limited breakdowns depending on requirements.

Correction of reports is handled by reembossing only the items affected or by complete reembossing, depending on the number of corrections.

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DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

FORM APPROVED
BUDGET BUREAU NO. 68-R588.1

MUNICIPAL WATER SUPPLY DATA - COMMUNITIES UNDER 25,000 POPULATION

1. State		2. Community or District 1/	
3. 1950 Population		4. Ownership M☐Public P☐Private	
	Date as of:		15. Improvements Needed:
	2/	12/31/57	2/ 3/
5. Estimated Population Served			N ☐☐ None U ☐☐ Source, underground
6. Year a. present supply Operation ____			S ☐☐ Source, surface
Started b. present treatment plant			M ☐☐ Transmission P ☐☐ Pumping
7. Number of Services			T ☐☐ Treatment
8. Number of Meters			D ☐☐ Distribution system
9. Source of Supply Number of wells ____ Lake(s) or stream(s)- name		Indicate Changes in Remarks Column.	DISTRIBUTION STORAGE L ☐☐ Elevated G ☐☐ Ground
10. Safe yield - impounded (MGD)			REMARKS:
Maximum dependable draft ground water (MGD)			
11. Treatment plant capacity rated (MGD)			
12. Plant output average (MGD)			
13. Plant laboratory control Chemical (other than chlorine residual) Bacteriological None	C ☐ B ☐ N ☐	C ☐ B ☐ N ☐	
14. Distri- a. pumped to mains (MG)			
bution storage b. elevated (MG)			
1/ Other communities served by facility			

2/ Latest available information
3/ Information as of 12/31/57

COPIES
White - Returned to PHS-DSES Inventory Unit through channels.
Blue - Retained by PHS-Region
Salmon - Retained by State Health Department
Yellow - Retained by Water Works
Pink - Retained by PHS-DSES, Washington

Figure 1.

I. BASIC DATA

Methods

This summary is based on the data contained in the 1958 Inventory of Municipal Water Facilities. The term "municipal," as used here, includes not only incorporated and unincorporated communities, but also privately owned companies, water districts in their many forms and terminologies, and such places as mill villages where there is a permanent resident population engaged in the normal domestic pattern of living.

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DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

FORM APPROVED
BUDGET BUREAU NO. 68-R289.1

Municipal Water Treatment Plant Data for

Community or District — State

1/ 2/ TYPE OF PLANT

P — Purification
S — Softening
I — Iron or manganese removal
D — Disinfection

TREATMENT OR DEVICE

A — AERATION:
Ac — Contact beds or trays, coke or other material
Am — Patented aerator
As — Jet or spray aerator
Ap — Overflow trays, cascade or other splash aerator
Ao — Other type aerator

C — CHEMICAL DOSAGE FOR COAGULATION OR SOFTENING:
Ca — Alum
Cf — Iron salts
Cl — Lime
Cs — Soda Ash
Cr — Activated silica
Co — Other coagulant

D — DISINFECTION:
Dc — Chlorine gas
Dh — Calcium hypochlorite
Dx — Sodium hypochlorite
Dr — Free residual chlorine
Dd — Chlorine dioxide
Dz — Ozone
Do — Other means

F — FILTER:
Fa — Anthrafilt
Fc — Roughing or contact
Fd — Diatomaceous earth
Fg — Gravity (slow)
Fp — Pressure
Fr — Gravity (rapid)
Fs — Sand
Fz — Zeolite

N — AMMONIATION
Nc — Ammonium compound
Na — Ammonia gas

1/ 2/ TREATMENT OR DEVICE (CONT'D)

K — CHEMICAL DOSAGE FOR CORROSION CORRECTION OR WATER STABILIZATION
Kp — Phosphate compounds
Kg — Chlorine gas
Kh — Hypochlorite
Ks — Sodium silicate
Ka — Alkali feed for pH adjustment

M — MIXING DEVICE OR TANK
Ma — Air agitation
Mb — Baffle mix
Mh — Hydraulic (standing wave flume)
Mi — Injection or pump suction
Mo — Slow mechanical mix
Mp — Patented sludge blanket
Mr — Rapid mechanical mix
(MtpsSv) — "Liquon Reactor"; "Accelator"; or "Precipitator"

R — RECARBONATION

S — SEDIMENTATION
Sb — Baffled basins (except in or out)
Sc — Covered basins (except hooded)
Sm — Mechanical sludge removal
Sa — Open basin (may be in building)
Sv — Up flow cylindrical tanks
(MtpsSv) — "Liquon Reactor"; "Accelator"; or "Precipitator"

T — CHEMICAL TASTE AND ODOR CONTROL:
Tc — Activated carbon
Td — Chlorine dioxide
Ts — Sulfur dioxide
Tz — Ozone
To — Other

-V — FLUORIDE REDUCTION

V — FLUORIDE ADDITION
Va — Hydrofluosilicic acid
Vs — Sodium silicofluoride
Vf — Sodium fluoride
Vm — Ammonium silicofluoride
Vo — Other fluorides
V___ — Natural fluorides (_____ p. p. m.)

1/ Available information indicates your water purification processes are carried out in the following order:

2/ Please indicate recovery to renew 12/31/57 processes (using code at the left of boxes).

Figure 1a.

For the purpose of this summary the terms community and facility are used and are defined as follows:

A *community* is a political or geographic entity having a water supply to which a census population may be assigned. It is a water using entity and may be served by one or more water producing facilities. A community as used here is a recognized grouping of homes to which a population figure can be assigned. A water district as such is not considered a community.

A *facility* is a water producing entity. It may be a community, a water district, or a corporation. The "population served" associated

with it may include more than one community. There may be more than one facility in a community. Where water treatment is involved the terms "facility" and "plant" are used interchangeably.

The basic inventory listings were checked for omissions, certain data were interpreted for coding and all pertinent items were punched into cards. From these cards tabular data were produced using modern machine tabulating equipment.

The basic tabular data are shown in three major classifications: population size groups, States, and major drainage basins.

In conformity with the other summaries, population size groups are divided as follows:

Group	*Population range*
1	Under 500
2	500–1,000
3	1,000–5,000
4	5,000–10,000
5	10,000–25,000
6	25,000–50,000
7	50,000–100,000
8	100,000 and over

Individual entries were assigned to a particular population group on the basis of the 1950 census population of the community. For unincorporated and certain other communities where the census population was not available, data from the 1956 Rand McNally Commercial Atlas were used. Where this information was still lacking, the estimated population served was used as the census population. Special water and other districts were put into the group using the estimated population served, as no census figure was applicable. Where the estimated populations served were not available from the inventory, the 1950 census populations, rounded to the nearest 10, were used.

Following passage of the Water Pollution Control Act of 1948, the United States was divided into major drainage basins. These basins have been used in this report and are as follows.*

Northeast	Missouri River
North Atlantic	Southwest-Lower Mississippi
Southeast	Colorado River
Tennessee River	Western Gulf
Ohio River	Pacific Northwest
Lake Erie	California
Upper Mississippi	Great Basin
Western Great Lakes	

Figure 2 delineates these major drainage basins. These basins are further broken down into 242 minor basins, but are not used in this report. Summary information concerning each of these minor basins is on file at the Washington Headquarters of the Public Health Service's Water Supply and Pollution Control Division.

*Note: Alaska, Hawaii, Puerto Rico, and the Virgin Islands have been arbitrarily assigned each to itself as a major basin.

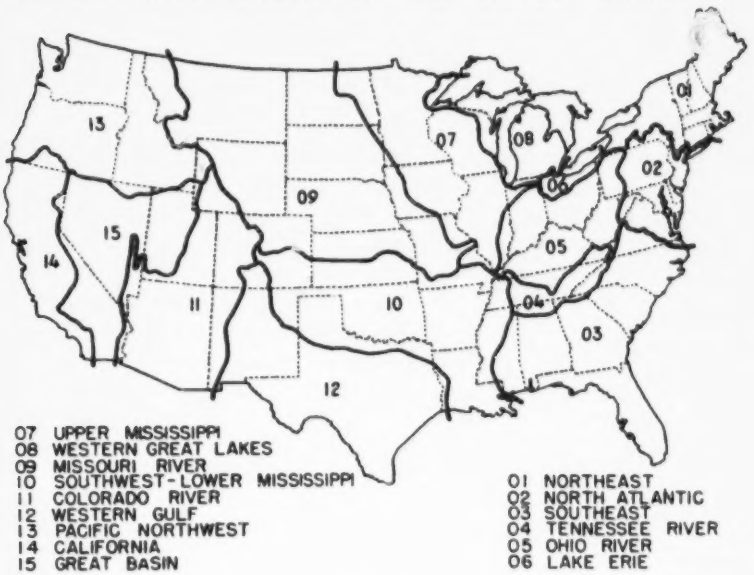

Figure 2.

As in the 1948 summary (*2*), only regularly used water supplies are included in this summary. Seasonal, auxiliary and emergency supplies and/or treatment works are not included.

Percentages are based on the total of the available data in the category under consideration. The tables which represent percentage changes were computed in accordance with the basic formula

$$\% \text{ change} = \frac{\text{Data for later year minus data for earlier year}}{\text{Data for earlier year}} \times 100$$

Tabular Data

All basic data in this summary are presented in the first 13 tables. The remainder are comparative or analytical tables. Tables 1 through 4 contain data on source of supply and treatment, treatment plants, type of disinfection and frequently used water treatment processes.

In contrast with the 1948 summary (*2*), tables 5 through 13 contain detailed data based on the facility concept rather than the community concept and are arranged by States, population groups, and major drainage basins. The reason for using the facility concept is twofold:

1. A more realistic interpretation of the data is obtained, in that in a community with two facilities of ground and surface sources it is possible statistically to separate ground from surface water rather than

leaving it in both. The same is true with treated and untreated water. Inevitably, however, there are some instances when these breakdowns cannot be made.

2. The summary will be in line with similar summaries for larger cities published since 1958.

Tables 5 through 9 contain various data on number of facilities and population served for a number of individual items. Table 10 contains data relative to the treatment status of supply and population served while tables 11 through 13 summarize the data by number of treatment plants in addition to population data.

Table 5 shows the 1950 census population of those communities served by public water facilities. In most instances, this figure is exceeded by the population served. This is due to the time factor involved between the 1950 census figures and the 1958 population served data.

Where necessary, data in tables 6 through 10 have been repeated to give comparisons with the information, and to furnish all the data without reference to a previous table.

Table 11 shows data on the number of plants and population served by the functional classes of treatment. "Treatment" in this summary means any action taken upon the water—even so small an item as simple aeration. These classes are as follows: purification, softening, iron and manganese removal, singly or in any combination: disinfection only or disinfection with miscellaneous treatment, and miscellaneous. These classes are used as a basic classification in the Inventory, and represent a description of the general function for which the plant was designed. In general, a plant was not classified as a "purification plant" unless some type of filter was used, although in some instances filters were used in categories not classified as purification.

Table 1. *General waterworks summary for the United States—by communities, ownership and estimated population served*

	Number	*Percent*
Communities—total	20,459	100.0
Served by ground sources	13,532	66.1
Served by surface sources	5,434	26.6
Served by both ground and surface sources	1,493	7.3
Served by treated supplies	12,702	62.1
Served by untreated supplies	7,479	36.5
Served by both treated and untreated supplies	274	1.3
Unknown treatment status	4	<.1
Ownership—total number of communities	18,144	100.0
Public	13,213	[1] 72.8
Private	4,793	[1] 26.4
Both public and private	138	[1] .8
Not stated	2,315	
Estimated population served—total	133,126,310	100.0
From ground sources	38,062,561	28.5
From surface sources	67,584,432	50.8
From both ground and surface sources	27,539,317	20.7
By treated supplies	119,770,025	90.0
By untreated supplies	10,307,663	7.7
By both treated and untreated supplies	2,971,222	2.2
Unknown treatment status	77,400	<.1

[1] Percent of total for those communities for which data are available.

Table 2. *Summary of treatment plants for the United States classified by plant function*

Plant classification	Number of plants	Estimated population served	Number of plants	Estimated population served
			Percent of total	*Percent of total*
Rapid sand purification:				
Purification only	2,145	49,859,109	21.6	41.0
Purification and softening	270	11,343,846	2.7	9.4
Purification and iron and manganese removal	66	766,939	.7	.6
Purification, softening, and iron and manganese removal	16	1,542,316	.1	1.3
Softening	375	2,766,848	3.6	2.3
Iron and manganese removal	968	3,932,630	9.2	3.2
Softening and iron and manganese removal	330	2,338,180	3.3	1.9
Chlorination:				
Simple	4,104	23,985,592	42.0	19.8
With some miscellaneous process	1,200	23,249,849	12.1	19.1
Miscellaneous	447	1,722,899	4.5	1.5
Total	9,911	121,508,208	100.0	100.0

Table 3. *Summary of waterworks disinfection practice for the United States—classified by type of disinfecting agent*

Type of disinfection	Number of plants	Estimated population served	Number of plants	Estimated population served
			Percent of total	*Percent of total*
Liquid chlorine	5,118	78,332,779	57.9	66.3
Hypochlorite	3,029	6,282,130	34.2	5.6
Ammonia—chlorine	404	28,069,053	4.6	23.9
Both liquid chlorine and hypochlorite	157	3,781,489	1.7	3.2
Unreported method	91	887,769	1.0	.7
Ozone	2	1,830	<.1	<.1
Other	44	1,957,808	.5	1.7
Total	8,845	117,323,863	100.0	100.0

Table 4. *Summary of some water treatment processes used in the United States*

	Number of plants using process*	Estimated population served
Filters:		
Rapid—sand	2,387	58,873,415
Slow—sand	106	6,233,620
Pressure	667	3,128,858
Rapid—(anthrafilt)	330	7,137,083
Softening:		
Lime—soda	540	15,469,362
Zeolite	416	2,210,578
Aeration	2,195	19,768,143
Taste and odor control	1,097	40,280,148
Corrosion control	2,089	42,803,354

*Plants using more than one process are included in total of each process.

Disinfection is examined as a separate unit process, and data relative to the various methods are summarized in table 12. Table 13 contains detailed data on number of plants and population served by the selective unit processes such as aeration, taste and odor control, corrosion control, filtration (both gravity rapid and slow sand), pressure sand filtration, anthrafilt and softening.

Table 5. *General summary of facilities, population served, by type of ownership*

Population groups, States and drainage basins	Total			Public		Private		Both		Not stated	
	Number of facilities	1950 census population	Population served	Number of facilities	Population served	Number of facilities	Population served	Number of facilities	Population served	Number of facilities	Population served
Population Groups											
Less than 500	5,107	1,610,028	1,746,179	3,021	1,085,333	1,871	578,319	24	9,942	191	72,585
500–1,000	4,135	3,552,085	3,348,479	2,889	2,423,207	1,098	801,661	25	23,936	124	99,675
1,000–5,000	5,762	14,717,711	15,021,550	4,434	12,064,373	1,188	2,646,141	36	86,795	104	224,241
5,000–10,000	1,180	9,510,287	9,731,218	947	8,047,252	200	1,445,043	8	45,322	25	193,601
10,000–25,000	896	13,802,411	14,801,275	699	12,241,233	174	2,210,873	8	105,000	15	244,169
25,000–50,000	344	10,535,785	11,753,531	249	9,413,519	88	2,172,154	2	57,358	5	110,500
50,000–100,000	183	9,658,538	12,395,062	138	9,506,411	45	2,888,651				
More than 100,000	201	45,828,715	64,329,016	152	56,195,021	45	7,624,455			4	509,540
States											
Alabama	29	1,497,194	1,896,767	205	1,676,197	64	203,784	1	500	21	16,286
Alaska	41	50,087	72,590	27	60,715	11	11,330			3	545
Arizona	142	375,519	766,753	50	594,352	88	167,951	2	2,400	2	2,050
Arkansas	220	780,036	974,002	163	757,817	37	161,259	8	41,052	12	13,874
California	1,470	8,658,364	12,695,262	809	9,892,399	624	2,694,422	2	1,700	35	106,741
Colorado	279	937,056	1,469,220	236	1,326,515	36	131,240			7	11,465
Connecticut	147	1,799,299	2,053,403	36	983,675	107	1,068,553	3	775	1	400
Delaware	33	169,514	324,619	27	251,375	6	73,244				
District of Columbia	2	802,173	1,173,000	2	1,173,000						
Florida	465	1,960,097	3,031,511	200	2,793,607	262	237,204	1	650	2	650
Georgia	382	1,684,407	2,516,387	342	2,476,845	31	33,002	2	1,600	7	4,940
Hawaii	79	416,988	456,675	37	384,713	35	39,657	1	3,800	6	28,505
Idaho	209	339,139	422,210	155	316,905	51	103,805	2	1,400	1	100
Illinois	836	7,173,194	8,432,756	675	7,528,334	143	870,596	1	171	17	33,655
Indiana	365	2,490,407	2,960,045	299	1,742,954	52	1,196,349	1	2,500	13	18,242
Iowa	684	1,646,604	1,766,960	666	1,598,995	16	166,490			2	1,475
Kansas	437	1,197,725	1,392,801	413	1,314,497	19	71,244			5	7,060
Kentucky	269	1,244,398	1,706,049	162	1,414,014	97	262,865	8	28,630	2	540
Louisiana	273	1,668,522	2,246,505	165	1,666,814	96	421,522	2	4,900	10	153,269
Maine	174	701,278	731,123	77	513,799	93	201,590	1	850	3	14,884
Maryland	112	1,554,812	2,236,305	61	2,167,135	44	53,980	2	3,460	5	11,730
Massachusetts	255	5,141,615	4,818,862	210	4,618,679	39	163,333			6	36,850
Michigan	513	4,592,629	4,491,774	365	4,340,477	136	113,290			12	38,007
Minnesota	551	1,947,169	1,983,011	531	1,963,146	20	19,865				
Mississippi	224	773,571	952,955	197	913,036	22	35,534	4	2,885	1	1,500
Missouri	375	2,634,357	3,357,937	331	2,899,047	40	953,680	1	1,000	3	4,210
Montana	162	351,541	481,762	120	343,367	30	127,526	1	400	11	10,469
Nebraska	431	847,007	943,261	419	939,251	1	555			11	3,455
Nevada	46	164,450	186,884	24	107,550	20	78,222			2	1,112
New Hampshire	128	426,830	450,987	90	347,051	31	82,136	1	14,000	6	7,800

New Jersey	353	4,764,090	5,803,551	158	2,311,416	190	3,461,960	3	11,175	2	19,000
New Mexico	193	419,523	691,393	149	573,838	36	113,780	1	110	7	3,665
New York	770	13,628,526	14,066,941	525	12,408,863	197	1,479,641	3	60,021	40	113,416
North Carolina	368	1,596,022	2,157,251	269	1,956,686	76	140,005	1	7,000	22	53,560
North Dakota	159	288,831	301,564	140	269,934	1	6,500			18	25,030
Ohio	545	6,041,139	7,343,473	464	6,807,631	36	256,820	1	1,156	44	277,866
Oklahoma	399	1,356,154	1,748,104	349	1,713,220	50	34,884				
Oregon	299	912,582	1,303,226	212	1,181,801	83	118,150			4	3,275
Pennsylvania	927	8,124,890	9,540,988	436	6,385,823	452	2,930,653	11	60,267	28	164,245
Rhode Island	47	809,066	821,340	21	756,284	26	65,056				
South Carolina	206	972,179	1,276,567	141	1,180,047	48	77,275			17	19,245
South Dakota	242	337,204	393,817	232	377,397	10	16,420				
Tennessee	260	1,550,098	2,331,389	200	1,903,589	52	396,485			8	31,315
Texas	1,073	5,506,541	7,813,466	745	7,463,644	308	308,067	5	5,615	15	36,140
Utah	320	593,929	727,278	207	632,723	101	61,205	3	5,270	9	28,080
Vermont	155	233,980	237,107	85	214,988	70	22,119				
Virginia	473	1,755,596	2,155,789	193	1,831,135	269	313,139	2	1,240	9	10,275
Washington	428	1,703,323	2,227,537	303	2,055,433	103	97,603	10	16,068	12	58,433
West Virginia	423	1,078,921	1,134,496	102	511,769	311	608,752	2	3,900	8	10,075
Wisconsin	413	2,203,437	2,462,051	370	2,314,732	22	86,964	6	20,853	15	39,502
Wyoming	95	190,541	240,311	70	189,540	17	27,491	6	23,005	2	275
Puerto Rico	62	1,105,464	1,336,500	60	1,310,400					2	26,100
Virgin Islands	3	17,542	19,795	3	19,795						
Major Drainage Basin											
Northeast	1,414	12,616,998	12,882,930	879	10,854,409	482	1,861,991	10	50,713	43	115,817
North Atlantic	1,617	23,976,623	27,589,624	785	20,423,989	767	6,840,653	17	69,295	48	255,687
Southeast	1,813	8,182,468	11,384,711	1,216	10,543,676	524	732,414	8	12,025	65	96,596
Tennessee River	287	999,813	1,546,352	200	1,138,058	77	385,844			10	22,450
Ohio River	1,911	10,911,467	13,090,674	1,135	9,519,959	695	3,425,755	14	64,526	67	80,434
Lake Erie	189	2,950,103	3,789,567	166	3,470,327	15	93,323			8	225,917
Upper Mississippi	2,188	12,059,183	13,803,231	1,958	12,141,569	187	1,576,526	4	1,371	39	83,765
Western Great Lakes	697	6,915,024	7,144,794	523	6,739,865	156	326,369	3	19,653	15	58,907
Missouri River	1,721	4,365,682	5,524,334	1,602	5,004,918	76	473,806	5	20,300	38	25,310
Southwest-Lower Mississippi	1,614	6,262,529	8,106,958	1,311	7,031,410	257	811,323	14	50,112	32	214,113
Colorado River	358	613,348	1,128,259	202	907,241	142	208,812	4	6,105	10	6,101
Western Gulf	1,108	5,424,235	7,745,449	767	7,347,077	317	379,812	5	5,615	19	12,945
Pacific Northwest	952	2,996,751	4,009,076	669	3,570,862	249	354,384	13	17,868	21	65,962
California	1,330	8,527,140	12,428,522	736	9,705,708	563	2,616,771	2	1,700	29	104,343
Great Basin	424	824,479	1,066,269	252	801,658	156	228,527	3	5,270	13	30,814
Alaska	41	50,087	72,590	27	60,715	11	11,330			3	545
Hawaii	79	382,671	456,675	37	384,713	35	39,657	1	3,800	6	28,505
Puerto Rico	62	1,139,417	1,336,500	60	1,310,400					2	26,100
Virgin Islands	3	17,542	19,795	3	19,795						
Total*	17,808	109,215,560	133,126,310	12,528	110,976,349	4,709	20,367,297	103	328,353	468	1,454,311

*Denotes total for each major division, population groups, States, and major drainage basins.

Table 6. *Source of water supply for number of facilities and population served—arranged by population groups, States, and drainage basins*

Population groups, States and drainage basins	Total		Ground sources		Surface sources		Both ground and surface sources	
	Number of facilities	Population served	Number of facilities	Population served	Number of facilities	Population served	Number of facilities	Population served
Less than 500	5,107	1,746,179	4,434	1,428,350	561	256,831	112	60,998
500–1,000	4,135	3,348,479	3,447	2,675,268	569	525,776	119	147,435
1,000–5,000	5,702	15,021,550	4,229	10,372,212	1,201	3,554,783	332	1,094,555
5,000, 10,000	1,180	9,731,218	692	5,242,534	373	3,433,551	115	1,055,133
10,000–25,000	896	14,801,275	506	7,305,664	298	5,770,878	92	1,724,733
25,000–50,000	344	11,753,531	170	4,596,043	143	5,924,864	31	1,232,624
50,000–100,000	183	12,395,062	77	3,565,479	90	7,591,011	16	1,238,572
More than 100,000	201	64,329,016	47	9,627,189	142	48,399,616	12	6,302,211
STATES								
Alabama	291	1,896,767	219	698,155	65	1,110,571	7	88,041
Alaska	41	72,590	11	13,070	24	23,822	6	35,698
Arizona	142	766,753	133	521,403	8	245,100	1	250
Arkansas	220	974,002	175	458,380	37	390,746	8	124,876
California	1,470	12,695,262	1,146	4,850,682	218	4,609,645	106	3,234,935
Colorado	279	1,469,220	175	308,138	88	1,071,086	16	89,996
Connecticut	147	2,053,403	75	110,920	43	1,368,675	29	573,808
Delaware	33	324,619	29	148,355	3	175,064	1	1,200
District of Columbia	2	1,173,000			2	1,173,000		
Florida	465	3,031,511	447	2,529,050	17	494,461	1	8,000
Georgia	382	2,516,387	296	682,040	73	1,779,572	13	54,775
Hawaii	79	456,675	53	267,543	22	25,632	4	163,500
Idaho	209	422,210	155	277,375	42	59,150	12	85,685
Illinois	836	8,432,756	714	2,137,968	116	6,162,174	6	132,614
Indiana	365	2,960,045	316	1,349,542	43	1,456,503	6	154,000
Iowa	684	1,766,960	641	1,076,849	37	433,540	6	256,571
Kansas	437	1,392,801	362	743,917	60	445,784	15	203,100
Kentucky	269	1,796,049	122	248,665	126	1,413,023	21	44,361
Louisiana	273	2,246,595	232	963,196	40	1,277,809	1	5,500
Maine	174	731,123	66	85,058	94	575,887	14	70,178
Maryland	112	2,236,305	81	191,980	23	2,023,475	8	20,850
Massachusetts	255	4,818,862	148	822,119	68	3,568,205	39	428,538
Michigan	513	4,491,774	432	1,273,998	74	3,098,109	7	119,667
Minnesota	551	1,933,011	524	867,910	26	765,101	1	350,000
Mississippi	224	952,955	220	702,955	3	200,000	1	50,000
Missouri	375	3,557,937	293	567,452	81	2,686,485	1	104,000
Montana	162	431,762	111	113,762	35	265,187	16	102,813
Nebraska	431	973,261	425	607,636	6	335,625		
Nevada	46	116,884	32	78,864	7	37,220	7	70,800
New Hampshire	128	410,987	60	150,749	61	246,482	7	53,756

New Jersey	353	5,803,551	299	2,036,162	26	2,473,430	28	1,293,959
New Mexico	193	691,393	174	542,843	12	55,750	7	92,800
New York	770	14,066,941	413	6,288,032	305	7,566,430	52	212,479
North Carolina	368	2,457,251	227	364,023	134	1,768,328	7	24,900
North Dakota	159	301,564	142	151,424	12	118,540	5	31,600
Ohio	545	7,343,473	407	2,012,735	108	5,017,269	30	313,469
Oklahoma	399	1,748,104	293	511,590	90	872,750	16	363,764
Oregon	299	1,303,226	163	264,334	107	970,419	29	68,473
Pennsylvania	927	9,540,988	508	982,865	308	7,815,985	111	742,138
Rhode Island	47	821,340	35	122,690	8	551,880	4	146,770
South Carolina	206	1,276,567	143	348,767	56	843,300	7	84,500
South Dakota	242	393,317	227	305,217	13	74,875	2	13,725
Tennessee	260	2,331,389	199	1,053,517	45	1,139,472	16	138,400
Texas	1,073	7,813,466	904	3,591,501	146	2,344,683	23	1,877,282
Utah	320	727,276	249	303,169	44	293,349	27	130,760
Vermont	155	237,107	91	47,995	38	132,531	26	56,581
Virginia	473	2,155,789	366	322,249	87	1,626,155	20	207,385
Washington	428	2,227,537	304	786,916	90	1,179,787	34	260,834
West Virginia	423	1,134,496	291	390,862	118	664,799	14	78,835
Wisconsin	413	2,462,051	390	1,194,151	22	1,257,900	1	10,000
Wyoming	95	240,314	60	96,216	25	64,000	10	80,095
Puerto Rico	62	1,336,500	22	240,900	40	1,095,600	.....	.....
Virgin Islands	3	19,795	2	6,850	1	12,945	.....	.....
Drainage Basins								
Northeast	1,413	12,874,393	710	1,830,734	546	9,578,731	157	1,464,928
North Atlantic	1,617	27,589,624	1,128	8,822,844	349	16,690,625	140	2,076,155
Southeast	1,813	11,364,711	1,449	4,983,538	329	6,082,157	35	319,016
Tennessee River	287	1,546,352	190	441,261	79	997,611	18	107,480
Ohio River	1,911	13,090,674	1,295	4,148,156	514	8,196,617	102	745,901
Lake Erie	188	3,788,961	120	279,449	58	3,357,069	10	152,443
Upper Mississippi	2,188	13,803,231	2,025	4,593,266	149	8,479,120	14	730,845
Western Great Lakes	697	7,144,794	575	1,953,636	114	5,061,491	8	129,667
Missouri River	1,721	5,524,334	1,489	2,190,768	192	2,954,783	40	378,783
Southwest-Lower Mississippi	1,614	8,106,958	1,323	4,198,832	251	3,220,686	40	687,440
Colorado River	359	1,136,796	260	698,626	84	419,180	15	18,996
Western Gulf	1,109	7,746,055	952	3,670,747	129	2,114,026	28	1,961,282
Pacific Northwest	952	4,009,076	622	1,308,117	251	2,243,980	79	456,979
California	1,330	12,428,522	1,047	4,687,375	184	4,531,162	99	3,209,985
Great Basin	424	1,066,269	329	477,033	61	372,073	34	217,163
Alaska	41	72,599	11	13,070	24	23,822	6	35,698
Hawaii	79	456,675	53	267,543	22	25,632	4	163,500
Puerto Rico	62	1,336,500	22	240,900	40	1,095,600	.....	.....
Virgin Islands	3	19,795	2	6,850	1	12,945	.....	.....
Total*	17,808	133,126,310	13,602	44,812,739	3,377	75,457,310	829	12,856,261

*Denotes total for each major division population groups, States and major drainage basins.

Table 7. *Treatment of water supply for number of facilities and population served—arranged by population groups, States, and drainage basins*

Population groups, States, and drainage basins	Total		Treated		Untreated		Both treated and untreated		Treatment if any, unreported	
	Number of facilities	Population served	Number of facilities	Population served	Number of facilities	Population served	Number of facilities	Population served	Number of facilities	Population served
Less than 500	5,107	1,746,179	1,671	702,449	3,425	1,039,090	11	4,640	.....	.....
500–1,000	4,135	3,348,479	2,166	1,925,695	1,958	1,414,432	11	8,352	.....	.....
1,000–5,000	5,762	15,021,550	3,779	10,541,086	1,963	4,333,475	20	46,989	.....	.....
5,000–10,000	1,180	9,731,218	932	8,245,374	242	1,440,927	6	44,917	.....	.....
10,000–25,000	896	14,801,275	683	12,619,122	205	1,949,102	8	233,051	.....	.....
25,000–50,000	344	11,753,531	278	10,886,159	64	788,372	2	79,000	.....	.....
50,000–100,000	183	12,395,062	149	11,796,707	33	520,955	.....	.....	1	77,400
More than 100,000	201	64,329,016	194	64,197,357	7	131,659	.....	.....	.....	.....
STATES										
Alabama	291	1,396,767	232	1,722,283	57	143,984	2	30,500	.....	.....
Alaska	41	72,590	17	49,330	23	16,260	1	7,000	.....	.....
Arizona	142	766,753	56	600,173	86	166,580	.....	.....	.....	.....
Arkansas	220	974,002	158	875,017	62	98,985	.....	.....	.....	.....
California	1,470	12,695,262	401	9,150,200	1,059	3,324,972	9	142,630	1	77,400
Colorado	279	1,469,220	147	1,356,385	130	111,035	2	1,800	.....	.....
Connecticut	147	2,053,403	96	1,974,284	51	79,119	.....	.....	.....	.....
Delaware	33	324,619	25	301,889	8	22,730	.....	.....	.....	.....
District of Columbia	2	1,173,000	2	1,173,000	.....	.....	.....	.....	.....	.....
Florida	465	3,031,511	324	2,879,801	138	140,870	3	10,840	.....	.....
Georgia	382	2,516,387	193	2,324,077	189	192,310	.....	.....	.....	.....
Hawaii	79	456,675	23	330,572	56	126,103	.....	.....	.....	.....
Idaho	209	422,210	64	295,330	144	123,880	1	3,000	.....	.....
Illinois	836	8,432,756	560	8,026,091	276	406,665	.....	.....	.....	.....
Indiana	365	2,960,045	311	2,866,247	54	93,798	.....	.....	.....	.....
Iowa	684	1,766,960	372	1,523,999	309	240,871	3	2,090	.....	.....
Kansas	437	1,392,801	387	1,355,766	50	37,035	.....	.....	.....	.....
Kentucky	269	1,706,049	225	1,684,561	44	21,488	.....	.....	.....	.....
Louisiana	273	2,246,505	147	2,027,244	126	219,261	.....	.....	.....	.....
Maine	174	731,123	111	677,811	63	53,312	.....	.....	.....	.....
Maryland	112	2,236,305	94	2,221,890	18	14,415	.....	.....	.....	.....
Massachusetts	255	4,818,862	142	4,381,845	106	357,161	7	79,856	.....	.....
Michigan	513	4,491,774	202	4,044,584	311	447,190	.....	.....	.....	.....
Minnesota	551	1,983,011	222	1,718,181	329	264,830	.....	.....	.....	.....
Mississippi	224	952,955	92	725,905	131	197,050	1	30,000	.....	.....
Missouri	375	3,357,937	201	3,179,710	174	178,227	.....	.....	.....	.....
Montana	162	481,762	92	418,296	70	63,466	.....	.....	.....	.....
Nebraska	431	943,261	38	552,780	393	390,481	.....	.....	.....	.....
Nevada	46	186,884	18	97,993	28	88,891	.....	.....	.....	.....
New Hampshire	128	450,987	63	370,619	65	80,368	.....	.....	.....	.....

New Jersey	353	5,803,551	252	5,460,876	99	326,975	2	15,700		
New Mexico	193	691,393	79	595,860	113	66,933	1	28,600		
New York	770	14,066,941	491	13,552,625	276	508,866	3	5,450		
North Carolina	368	2,157,251	227	2,013,102	139	141,499	2	2,650		
North Dakota	159	301,564	38	212,131	121	89,433				
Ohio	545	7,343,473	422	7,174,238	123	169,235				
Oklahoma	399	1,748,104	244	1,584,416	155	163,688				
Oregon	299	1,303,226	164	1,145,006	130	155,116	5	3,104		
Pennsylvania	927	9,540,988	696	9,291,253	225	211,073	6	38,662		
Rhode Island	47	821,340	32	790,980	15	30,360				
South Carolina	206	1,276,567	110	1,121,150	96	155,417				
South Dakota	242	393,817	99	327,495	143	66,322				
Tennessee	260	2,331,389	226	2,285,940	34	45,449				
Texas	1,073	7,813,466	593	7,150,755	480	662,711				
Utah	320	727,278	95	542,068	225	185,210				
Vermont	155	237,107	52	180,696	100	50,344	3	6,067		
Virginia	473	2,155,789	237	2,015,934	232	136,655	4	3,200		
Washington	428	2,227,537	143	1,801,049	283	424,988	2	1,500		
West Virginia	423	1,134,496	308	1,083,612	115	50,884				
Wisconsin	413	2,462,051	220	2,242,692	192	215,059	1	4,300		
Wyoming	95	240,311	47	199,648	48	40,663				
Puerto Rico	62	1,336,500	62	1,336,500						
Virgin Islands	3	19,795			3	19,795				
Drainage Basins										
Northeast	1,413	12,874,393	836	11,976,660	567	811,810	10	85,923		
North Atlantic	1,617	27,589,624	1,058	26,610,060	549	952,852	10	26,712		
Southeast	1,813	11,384,711	1,099	10,378,067	704	930,354	10	76,290		
Tennessee River	287	1,546,352	252	1,520,477	35	25,875				
Ohio River	1,911	13,090,674	1,502	12,674,814	406	381,860	3	34,000		
Lake Erie	188	3,788,961	158	3,751,852	30	37,109				
Upper Mississippi	2,188	13,803,231	1,163	12,755,770	1,025	1,047,461				
Western Great Lakes	697	7,144,794	323	6,600,982	373	539,512	1	4,300		
Missouri River	1,721	5,524,334	753	4,698,494	964	822,450	4	3,390		
Southwest-Lower Mississippi	1,614	8,106,958	983	7,342,665	630	763,793	1	500		
Colorado River	359	1,136,796	156	831,043	203	305,753				
Western Gulf	1,109	7,746,055	593	7,072,386	515	645,069	1	28,600		
Pacific Northwest	952	4,009,076	393	3,303,475	552	700,997	7	4,604		
California	1,330	12,428,522	368	9,068,194	953	3,141,498	8	141,430	1	77,400
Great Basin	424	1,066,269	113	712,608	309	349,461	2	4,200		
Alaska	41	72,590	17	49,330	23	16,260	1	7,000		
Hawaii	79	456,675	23	330,572	56	126,103				
Puerto Rico	62	1,336,500	62	1,336,500						
Virgin Islands	3	19,795			3	19,795				
Total*	17,808	133,126,310	9,852	121,013,949	7,897	11,618,012	58	416,949	1	77,400

*Denotes total for each major division population groups, States, and major drainage basins.

Table 8. *Treatment of ground water supplies—by number of facilities and estimated population served—arranged by population groups, States, and drainage basins*

Population groups, States and drainage basins	Number of facilities				Estimated population served			
	Total	Treated	Untreated	Both treated and untreated	Total	Treated	Untreated	Both treated and untreated
POPULATION GROUPS								
Less than 500	4,134	1,228	3,200	6	1,428,350	463,072	962,588	2,690
500–1,000	3,447	1,566	1,873	8	2,675,268	1,325,956	1,343,210	6,102
1,000–5,000	4,229	2,343	1,873	13	10,372,212	6,199,110	4,139,722	33,380
5,000–10,000	692	459	229	4	5,242,534	3,865,038	1,344,796	32,700
10,000–25,000	506	302	201	3	7,305,664	5,299,119	1,874,065	132,480
25,000–50,000	170	108	61	1	4,596,043	3,840,883	725,160	30,000
50,000–100,000	77	45	32	.....	3,565,479	3,125,146	440,333	.....
More than 100,000	47	41	6	.....	9,627,189	9,495,730	131,459	.....
STATES								
Alabama	219	160	57	2	698,155	523,671	143,984	30,500
Alaska	11	5	6	.....	13,070	6,670	6,400	.....
Arizona	133	47	86	.....	521,403	354,823	166,580	.....
Arkansas	175	113	62	.....	458,380	359,395	98,985	.....
California	1,146	169	970	7	4,850,682	1,674,938	3,082,234	93,510
Colorado	175	64	111	.....	308,138	208,379	99,759	.....
Connecticut	75	27	48	.....	110,920	56,551	54,369	.....
Delaware	29	21	8	.....	148,355	125,625	22,730	.....
District of Columbia	.....	.....	.....	.....	.....	.....	.....	.....
Florida	447	306	138	3	2,529,050	2,377,340	140,870	10,840
Georgia	296	107	189	.....	682,040	489,730	192,310	.....
Hawaii	53	10	43	.....	267,543	159,395	108,148	.....
Idaho	155	32	122	1	277,375	163,120	111,255	3,000
Illinois	714	439	275	.....	2,137,968	1,759,303	378,665	.....
Indiana	316	264	52	.....	1,349,542	1,256,514	93,028	.....
Iowa	641	330	308	3	1,076,849	834,868	239,891	2,090
Kansas	362	312	50	.....	743,917	706,882	37,035	.....
Kentucky	122	83	39	.....	248,665	228,922	19,743	.....
Louisiana	232	106	126	.....	963,196	743,935	219,261	.....
Maine	66	19	47	.....	85,058	48,050	37,008	.....
Maryland	81	67	14	.....	191,980	178,725	13,255	.....
Massachusetts	148	55	92	1	822,119	482,348	333,771	6,000
Michigan	432	123	309	.....	1,273,998	827,210	446,788	.....
Minnesota	524	195	329	.....	867,910	603,080	264,830	.....
Mississippi	220	88	131	1	702,955	475,905	197,050	30,000
Missouri	293	119	174	.....	567,452	389,225	178,227	.....
Montana	111	45	66	.....	113,762	52,415	61,347	.....
Nebraska	425	32	393	.....	607,636	217,155	390,481	.....
Nevada	32	7	25	.....	78,864	3,973	74,891	.....
New Hampshire	60	15	45	.....	150,749	90,228	60,521	.....

New Jersey	299	201	96	2	2,036,162	1,700,007	320,455	15,700
New Mexico	174	60	113	1	542,843	447,310	66,933	28,600
New York	413	176	234	3	6,288,032	5,808,016	474,566	5,450
North Carolina	227	87	138	2	364,023	228,185	133,188	2,650
North Dakota	142	22	120		151,424	63,191	88,233	
Ohio	407	284	123		2,012,735	1,843,500	169,235	
Oklahoma	293	140	153		511,590	348,341	163,249	
Oregon	163	48	113		264,334	130,448	132,736	1,150
Pennsylvania	508	306	201	2	982,865	825,467	157,286	112
Rhode Island	35	20	15	1	122,690	92,330	30,360	
South Carolina	143	47	96		348,767	193,350	155,417	
South Dakota	227	84	143		305,217	238,895	66,322	
Tennessee	199	165	34		1,053,517	1,008,068	45,449	
Texas	904	426	478		3,591,501	2,929,090	662,411	
Utah	249	40	209		303,169	135,869	167,300	
Vermont	91	11	79	1	47,995	18,747	28,998	250
Virginia	366	134	228	4	322,249	182,824	136,225	3,200
West Virginia	304	59	245		786,916	404,289	382,627	
Wisconsin	291	185	106		390,862	343,402	47,460	
Wyoming	390	197	192	1	1,194,151	974,792	215,059	4,300
Puerto Rico	60	18	42		96,216	58,658	37,558	
Virgin Islands	22	22			240,900	240,900		
	2		2		6,850		6,850	
Drainage Basins								
Northeast	710	251	457	2	1,830,734	1,148,687	675,797	6,250
North Atlantic	1,128	605	516	7	8,822,844	7,904,373	896,609	21,862
Southeast	1,449	736	703	10	4,983,538	3,985,205	922,043	76,290
Tennessee River	190	157	33		441,261	415,666	25,595	
Ohio River	1,295	910	384	1	4,148,156	3,781,233	366,623	300
Lake Erie	120	90	30		279,449	242,340	37,109	
Upper Mississippi	2,025	1,001	1,024		4,593,266	3,573,805	1,019,461	
Western Great Lakes	575	203	371	1	1,953,636	1,410,226	539,110	4,300
Missouri River	1,489	533	953	3	2,190,768	1,372,553	816,125	2,090
Southwest—Lower Mississippi	1,323	696	627		4,198,832	3,436,278	762,554	
Colorado River	260	82	178		698,620	419,153	279,467	
Western Gulf	952	439	512	1	3,670,747	2,998,028	644,119	28,600
Pacific Northwest	622	145	475	2	1,308,117	681,622	625,345	1,150
California	1,047	160	881	6	4,687,375	1,687,865	2,907,200	92,310
Great Basin	329	47	280	2	477,033	150,055	322,778	4,200
Alaska	11	5	6		13,070	6,670	6,400	
Hawaii	53	10	43		267,543	159,395	108,148	
Puerto Rico	22	22			240,900	240,900		
Virgin Islands	2		2		6,850		6,850	
Total*	13,602	6,092	7,475	35	44,812,739	33,614,054	10,961,333	237,352

*Denotes total per each major division population groups, States, and major or drainage basins.

Table 9. *Treatment of surface water supplies—by number of facilities and estimated population served—arranged by population groups, States, and drainage basins*

Population groups, States, and drainage basins	Number of facilities				Estimated population served			
	Total	Treated	Untreated	Both treated and untreated	Total	Treated	Untreated	Both treated and untreated
POPULATION GROUPS								
Less than 500	561	381	180		256,831	201,433	55,398	
500–1,000	569	501	68		525,776	468,744	57,032	
1,000–5,000	1,201	1,148	52	1	3,554,783	3,446,315	107,168	1,300
5,000–10,000	373	367	6		3,433,551	3,388,540	45,011	
10,000–25,000	298	295	3		5,770,878	5,709,091	61,787	
25,000–50,000	143	142		1	5,924,864	5,875,864		49,000
50,000–100,000	90	90			7,591,011	7,591,011		
More than 100,000	142	141	1		48,399,616	48,399,416	200	
STATES								
Alabama	65	65			1,110,571	1,110,571		
Alaska	24	9	15		23,822	14,905	8,917	
Arizona	8	8			245,100	245,100		
Arkansas	37	37			390,746	390,746		
California	218	154	63	1	4,609,645	4,496,847	63,798	49,000
Colorado	88	71	16	1	1,071,086	1,059,556	10,230	1,300
Connecticut	43	43			1,368,675	1,368,375		
Delaware	3	3			175,064	175,064		
District of Columbia	2	2			1,173,000	1,173,000		
Florida	17	17			494,461	494,461		
Georgia	73	73			1,779,572	1,779,572		
Hawaii	22	10	12		25,632	9,177	16,455	
Idaho	42	25	17		59,150	48,250	10,900	
Illinois	116	115	1		6,162,174	6,134,174	28,000	
Indiana	43	41	2		1,456,503	1,455,733	770	
Iowa	37	36	1		433,540	432,560	980	
Kansas	60	60			445,784	445,784		
Kentucky	126	123	3		1,413,023	1,411,823	1,200	
Louisiana	40	40			1,277,809	1,277,809		
Maine	94	80	14		575,887	561,333	14,554	
Maryland	23	19	4		2,023,475	2,022,315	1,160	
Massachusetts	68	60	8		3,568,205	3,557,575	10,630	
Michigan	74	72	2		3,098,109	3,097,707	402	
Minnesota	26	26			765,101	765,101		
Mississippi	3	3			200,000	200,000		
Missouri	81	81			2,686,485	2,686,485		
Montana	35	32	3		265,187	264,668	519	
Nebraska	6	6			335,625	335,625		
Nevada	7	6	1		37,220	25,220	12,000	
New Hampshire	61	44	17		246,482	229,560	16,922	

New Jersey	26	26			2,473,430	2,473,430		
New Mexico	12	12			55,750	55,750		
New York	305	276	29		7,566,430	7,544,619	21,811	
North Carolina	134	133	1		1,768,328	1,760,017	8,311	
North Dakota	12	11	1		118,540	117,340	1,200	
Ohio	108	108			5,017,269	5,017,269		
Oklahoma	90	89	1		872,750	872,450	300	
Oregon	107	94	13		970,419	954,989	15,430	
Pennsylvania	308	292	16		7,815,985	7,789,898	26,087	
Rhode Island	8	8			551,880	551,880		
South Carolina	56	56			843,300	843,300		
South Dakota	13	13			74,875	74,875		
Tennessee	15	15			1,139,472	1,139,472		
Texas	146	144	2		2,344,683	2,344,383	300	
Utah	44	35	9		293,349	286,599	6,750	
Vermont	38	28	10		132,531	125,910	6,621	
Virginia	87	83	4		1,626,155	1,625,725	430	
Washington	90	60	30		1,179,787	1,157,222	22,565	
West Virginia	118	109	9		664,799	661,375	3,424	
Wisconsin	22	22			1,257,900	1,257,900		
Wyoming	25	20	5		64,000	61,015	2,985	
Puerto Rico	40	40			1,095,600	1,095,600		
Virgin Islands	1		1		12,945		12,945	
Drainage Basins								
Northeast	546	471	75		9,578,731	9,510,863	67,868	
North Atlantic	349	328	21		16,690,625	16,667,331	23,294	
Southeast	329	328	1		6,082,157	6,073,846	8,311	
Tennessee River	79	77	2		997,611	997,331	280	
Ohio River	514	496	18		8,196,617	8,184,450	12,167	
Lake Erie	58	58			3,357,069	3,357,069		
Upper Mississippi	149	148	1		8,479,120	8,451,120	28,000	
Western Great Lakes	114	112	2		5,061,491	5,061,089	402	
Missouri River	192	183	8	1	2,954,783	2,949,508	3,975	1,300
Southwest Lower Mississippi	251	249	2		3,220,686	3,219,586	1,100	
Colorado River	84	65	19		419,180	396,520	22,660	
Western Gulf	129	126	3		2,114,026	2,113,076	950	
Pacific Northwest	251	190	61		2,243,980	2,196,616	47,364	
California	184	133	50	1	4,531,162	4,422,554	59,608	49,000
Great Basin	61	42	19		372,073	359,773	12,300	
Alaska	24	9	15		23,822	14,905	8,917	
Hawaii	22	10	12		25,632	9,177	16,455	
Puerto Rico	40	40			1,095,600	1,095,600		
Virgin Islands	1		1		12,945		12,945	
Total*	3,377	3,065	310	2	75,457,310	75,080,414	326,596	50,300

*Denotes total for each major division population groups, States, and major drainage basins.

Table 10. *Treatment of supply for number of facilities and estimated population served by both ground and surface sources—arranged by population groups, States, and drainage basins*

Population groups, States, and drainage basins	Number of facilities					Estimated population served				
	Total	Treated	Untreated	Both treated and untreated	Treatment if any, not reported	Total	Treated	Untreated	Both Treated and untreated	Treatment if any, not reported
POPULATION GROUPS										
Less than 500	112	62	45	5		60,998	37,944	21,104	1,950	
500–1,000	119	99	17	3		147,435	130,995	14,190	2,250	
1,000–5,000	332	288	38	6		1,094,555	995,661	86,585	12,309	
5,000–10,000	115	106	7	2		1,055,133	991,796	51,120	12,217	
10,000–25,000	92	86	1	5		1,724,733	1,610,912	13,250	100,571	
25,000–50,000	31	28	3			1,232,624	1,169,412	63,212		
50,000–100,000	16	14	1			1,238,572	1,080,550	80,622		
More than 100,000	12	12			1	6,302,211	6,302,211			77,400
STATES										
Alabama	7	7								
Alaska	6	3								
Arizona	1	1	2	1		88,041	88,041			
Arkansas	8	8				35,698	27,755	943	7,000	
California	106	78	26	1	1	250	250			
Colorado						124,876	124,876			
Connecticut	16	12	3	1		3,234,935	2,978,475	178,940	120	77,400
Delaware	29	26	3							
District of Columbia	1	1				89,996	88,450	1,046	500	
Florida						573,808	549,058	24,750		
Georgia	1	1				1,200	1,200			
Hawaii										
Idaho	13	13				8,000	8,000			
Illinois	4	3	1							
Indiana	12	7	5			54,775	54,775			
Iowa	6	6				163,500	162,000	1,500		
Kansas	6	6				85,685	83,960	1,725		
Kentucky						132,614	132,614			
Louisiana	6	6				154,000	154,000			
Maine	15	15								
Maryland	21	19	2			256,571	256,571			
Massachusetts	1	1				203,100	203,100			
Michigan	14	12	2			44,361	43,816	545		
Minnesota	8	8				5,500	5,500			
Mississippi	39	27	6	6		70,178	68,428	1,750		
Missouri	7	7				20,850	20,850			
Montana	1	1				428,538	341,922	12,760	73,856	
Nebraska	1	1				119,667	119,667			
Nevada	1	1				350,000	350,000			
New Hampshire	16	15	1			50,000	50,000			
						104,000	104,000			
	7	5	2			102,813	101,213	1,600		
	7	4	3							
						70,800	68,800	2,000		
						53,756	50,831	2,925		

New Jersey	28	25	3			1,293,959	1,287,439	6,520		
New Mexico	7	7				92,800	92,800			
New York	52	39	13			212,479	199,990	12,489		
North Carolina	7	7				24,900	24,900			
North Dakota	5	5				31,600	31,600			
Ohio	30	30				313,469	313,469			
Oklahoma	16	15	1			363,764	363,625	139		
Oregon	29	22	4	3		68,473	59,569	6,950	1,954	
Pennsylvania	111	98	8	5		742,138	675,888	27,700	38,550	
Rhode Island	4	4				146,770	146,770			
South Carolina	7	7				84,500	84,500			
South Dakota	2	2				13,725	13,725			
Tennessee	16	16				138,400	138,400			
Texas	23	23				1,877,282	1,877,282			
Utah	27	20	7			130,760	119,600	11,160		
Vermont	26	13	11	2		56,581	36,039	14,725	5,817	
Virginia	20	20				207,385	207,385			
Washington	34	24	8	2		260,834	239,538	19,796	1,500	
West Virginia	14	14				78,835	78,835			
Wisconsin	1	1				10,000	10,000			
Wyoming	10	9	1			80,095	79,975	120		
Puerto Rico										
Virgin Islands										
Drainage Basins										
Northeast	157	114	35	8		1,464,928	1,317,110	68,145	79,673	
North Atlantic	140	125	12	3		2,076,155	2,038,356	32,949	4,850	
Southeast	35	35				319,016	319,016			
Tennessee River	18	18				107,480	107,480			
Ohio River	102	96	4	2		745,901	709,131	3,070	33,700	
Lake Erie	10	10				152,443	152,443			
Upper Mississippi	14	14				730,845	730,845			
Western Great Lakes	8	8				129,667	129,667			
Missouri River	40	37	3			378,783	376,433	2,350		
Southwest Lower Mississippi	40	38	1	1		687,440	686,801	139	500	
Colorado River	15	9	6			18,996	15,370	3,626		
Western Gulf	28	28				1,961,282	1,961,282			
Pacific Northwest	79	58	16	5		456,979	425,237	28,288	3,454	
California	99	75	22	1	1	3,209,985	2,957,775	174,690	120	77,400
Great Basin	34	24	10			217,163	202,780	14,383		
Alaska	6	3	2	1		35,698	27,755	943	7,000	
Hawaii	4	3	1			163,500	162,000	1,500		
Puerto Rico										
Virgin Islands										
Total*	829	695	112	21	1	12,856,261	12,319,481	330,083	129,297	77,400

*Denotes total for each major division population groups, States, and major drainage basins.

Table 11. *Number of plants and population served by various functional classes of treatment—arranged by population groups, States, and drainage basins*

Population groups, States, and drainage basins	Total		Purification		Combined purification and softening		Combined purification and iron and manganese removal		Combined purification softening and iron and manganese removal		Softening		Iron and manganese removal		Combined softening and iron and manganese removal	
	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served
POPULATION GROUPS																
Less than 500	1,682	707,089	135	105,484	6	4,965	2	800			34	15,067	195	75,269	29	13,829
500–1,000	2,177	1,944,047	290	288,179	30	32,783	16	12,660	4	3,225	92	80,571	266	201,007	80	66,066
1,000–5,000	3,799	10,688,075	901	2,873,407	83	231,515	20	61,885	15	44,731	156	388,904	330	821,537	152	421,242
5,000–10,000	938	8,290,291	322	3,050,886	43	386,169	9	117,835	5	43,360	27	218,268	58	476,248	39	351,278
10,000–25,000	691	12,852,173	239	4,771,352	57	1,002,302	12	254,370	1	21,000	29	567,339	32	474,719	17	376,155
25,000–50,000	280	10,965,159	103	4,441,774	19	817,062	5	153,300	5	258,000	10	406,328	19	685,280	9	421,510
50,000–100,000	150	11,874,107	64	5,691,071	8	697,200	1	60,300	1	152,000	3	289,570	1	128,000	2	188,100
More than 100,000	194	64,197,357	91	28,637,046	24	8,171,850	1	105,789	5	1,020,000	4	800,801	7	1,071,570	2	500,000
STATES																
Alabama	234	1,752,783	77	1,121,023			2	106,689			1	50	24	51,788	1	750
Alaska	18	56,330	2	3,130												
Arizona	56	600,173	7	240,490							5	10,400				
Arkansas	158	875,017	39	503,747	3	9,400	4	8,975	1	5,000	2	19,904	39	125,613	10	48,320
California	411	9,370,290	51	2,346,059	4	814,500	1	35,200			5	108,350	6	21,817		
Colorado	149	1,358,185	38	971,205	1	3,500							1	225		
Connecticut	96	1,974,284	23	1,093,480							1	3,396	1	140		
Delaware	25	301,889	2	172,450									6	12,550		
District of Columbia	2	1,173,000	2	1,173,000												
Florida	327	2,890,641	8	101,000	4	285,860	1	10,500	5	72,761	17	379,410	15	45,790	28	925,241
Georgia	193	2,324,077	85	1,823,497	3	22,200	1	6,500			4	20,915	6	12,100	1	1,000
Hawaii	23	330,572	6	4,729												
Idaho	65	298,330	5	51,200												
Illinois	560	8,026,091	102	3,490,508	12	224,000	1	24,000	6	262,980	21	29,808	99	248,695	96	336,640
Indiana	311	2,866,247	43	1,411,103	1	151,000	2	40,600	1	1,000	9	31,078	48	257,793	20	114,342
Iowa	375	1,526,089	27	247,370	7	202,290					46	412,936	134	186,010	32	30,528
Kansas	387	1,355,766	53	343,834	19	261,395			1	35,000	13	321,540	11	17,980	7	31,875
Kentucky	225	1,684,561	136	898,986	8	569,360	41	4,470	2	7,000	8	86,605	8	37,100	2	4,825
Louisiana	147	2,027,244	11	384,490	28	869,319	3	1,580	4	21,590	4	42,600	21	102,890	24	194,925
Maine	111	677,811	19	160,933	1	2,000	1	16,000					2	18,100	1	3,852
Maryland	94	2,221,890	16	1,643,415	1	48,640					1	1,250	10	21,025	2	2,235
Massachusetts	149	4,461,701	22	650,470									6	50,833		
Michigan	202	4,044,584	39	2,522,597	12	506,508					5	28,394	24	108,895	10	199,871
Minnesota	222	1,718,181	23	135,200	3	902,000					4	5,780	97	201,675	11	17,790
Mississippi	93	755,905	4	250,000			2	2,795			2	50,000	26	96,155	1	800

Missouri	201	3,179,710	103	590,945	11	2,296,670	5	9,700	6	92,910	15	25,280	16	27,095	3	3,020
Montana	92	418,296	11	171,240	2	17,500							1	600		
Nebraska	38	552,780	8	343,725							2	12,110	17	164,345	4	7,790
Nevada	18	97,993	1	3,020			1	3,300								
New Hampshire	63	370,619	3	7,270									2	19,835		
New Jersey	254	5,476,576	28	2,083,157			4	49,660	1	12,000	1	16,600	28	429,138	2	12,700
New Mexico	80	624,460	13	83,550							2	2,100	1	12,000		
New York	494	13,558,075	122	2,504,243	3	20,800	4	57,260	1	585	10	64,064	11	539,623	2	7,965
North Carolina	229	2,015,752	116	1,626,347	2	9,800					5	15,000	16	29,176	5	43,200
North Dakota	38	212,131	13	51,825	8	109,921					1	1,000	2	1,500		
Ohio	422	7,174,238	67	3,417,749	67	2,146,951					96	705,299	50	89,579	32	159,406
Oklahoma	244	1,584,416	84	783,534	10	443,350	2	13,350					1	500		
Oregon	169	1,148,110	20	214,434							1	4,721	1	6,000		
Pennsylvania	702	9,329,915	148	5,766,374	30	706,665	12	213,560	4	161,490	18	189,830	7	17,793	3	31,000
Rhode Island	32	790,980	9	620,250							1	50	1	9,000		
South Carolina	110	1,121,150	66	783,800			1	600					9	37,050	3	9,100
South Dakota	99	327,495	7	13,575	7	73,700					4	6,850	20	30,330	1	65,000
Tennessee	226	2,285,940	78	1,368,412	1	3,400					1	190	33	608,598		
Texas	593	7,150,755	134	2,705,593	13	594,167	9	52,375	4	870,000	4	50,250	6	61,155		
Utah	95	542,068	11	43,014	1	300										
Vermont	55	186,763	5	56,701												
Virginia	241	2,019,134	81	1,697,078	2	21,500	2	62,300			4	4,300	18	9,790	1	3,000
Washington	145	1,802,549	16	125,302			1	8,250					1	600	1	250
West Virginia	308	1,083,612	101	720,260	4	5,650	3	29,275			17	35,470	47	126,581	9	15,730
Wisconsin	221	2,246,992	20	1,202,900	1	19,000					24	80,307	25	150,174	18	69,022
Wyoming	47	199,648	7	86,075	1	2,500					1	1,011				
Puerto Rico	62	1,336,500	33	1,045,000												
Virgin Islands																
DRAINAGE BASIN																
Northeast	846	12,062,583	172	4,602,491	4	22,800	5	73,260	1	585	9	32,552	15	112,008	3	11,817
North Atlantic	1,068	26,636,772	196	11,072,612	10	104,495	7	128,160	2	15,490	17	105,138	79	1,002,812	5	15,935
Southeast	1,109	10,454,357	346	5,625,229	10	330,360	6	184,589	5	72,761	27	415,375	86	249,588	38	979,294
Tennessee River	252	1,520,477	88	1,049,267	1	3,400	1	1,200			1	400	11	22,165		
Ohio River	1,505	12,708,814	443	6,062,911	71	2,481,529	18	220,205	8	187,980	116	927,555	160	552,023	64	247,396
Lake Erie	158	3,751,852	32	2,447,351	31	1,051,252					24	74,097	14	11,430	14	89,882
Upper Mississippi	1,163	12,755,770	131	3,582,084	32	2,877,205	2	28,200	7	247,410	76	450,959	303	632,473	135	420,840
Western Great Lakes	324	6,606,282	77	4,337,098	13	525,508					18	95,276	31	156,598	15	215,83
Missouri River	757	4,701,884	164	2,103,350	29	1,134,471	2	1,350	3	115,000	35	76,956	90	257,750	17	105,265
Southwest Lower Mississippi	984	7,343,165	210	2,169,032	52	1,513,869	16	44,555	6	33,090	15	413,719	102	886,346	38	251,670
Colorado River	156	831,043	27	346,414	1	300	1	3,300			5	10,400	1	12,000		
Western Gulf	594	7,100,986	120	2,622,486	12	484,167	6	38,670	4	870,000	6	52,350	8	9,020		
Pacific Northwest	400	3,308,079	42	396,436			1	8,250			1	4,721	2	6,600	1	250
California	377	9,287,024	47	2,307,869	2	791,000	1	35,200			5	108,350	6	21,817		
Great Basin	115	716,808	9	81,710	2	23,500										
Alaska	18	56,330	2	3,130												
Hawaii	23	330,572	6	4,729												
Puerto Rico	62	1,336,500	33	1,045,000												
Virgin Islands																
Total*	9,911	121,508,298	2,145	49,859,199	270	11,343,846	66	766,939	36	1,542,316	355	2,766,848	908	3,932,630	330	2,338,180

*Denotes total for each major division population groups, States, and major drainage basins.

Missouri	201	3,179,[illegible]	103	590,945	11	2,296,670	5	9,700	6	92,910	15	25,280	16	27,095	3	3,020
Montana	92	418,296	11	171,240	2	17,500							1	600		
Nebraska	38	552,780	8	343,725							2	12,110	17	164,345	4	7,790
Nevada	18	97,993	1	3,020			1	3,300								
New Hampshire	63	370,619	3	7,270									2	19,835		
New Jersey	254	5,476,576	28	2,083,157			4	49,660	1	12,000	1	16,600	28	429,138	2	12,700
New Mexico	80	624,460	13	83,550							2	2,100	1	12,000		
New York	494	13,558,075	122	2,504,243	3	20,800	4	57,260	1	585	10	64,064	11	539,623	2	7,965
North Carolina	229	2,015,752	116	1,626,347	2	9,800					5	15,000	16	29,170	5	43,200
North Dakota	38	212,131	13	51,825	8	109,921					1	1,000	2	1,500		
Ohio	422	7,174,238	67	3,417,749	67	2,146,951					96	705,299	50	89,579	32	159,406
Oklahoma	244	1,584,416	84	783,534	10	443,350	2	13,350					1	500		
Oregon	169	1,148,110	20	214,434							1	4,721	1	6,000		
Pennsylvania	702	9,329,915	148	5,766,374	30	706,665	12	213,560	4	161,490	18	189,830	7	17,793	3	31,000
Rhode Island	32	790,980	9	620,250							1	50	1	9,000		
South Carolina	110	1,121,150	66	783,800			1	600					9	37,050	3	9,100
South Dakota	99	327,495	7	13,575	7	73,700					4	6,850	20	30,330	1	65,000
Tennessee	226	2,285,940	78	1,368,412	1	3,400					1	190	33	608,598		
Texas	593	7,150,755	134	2,705,593	13	594,167	9	52,375	4	870,000	4	50,250	6	61,155		
Utah	95	542,068	11	43,014	1	300										
Vermont	55	186,763	5	56,701												
Virginia	241	2,019,134	81	1,697,078	2	21,500	2	62,300			4	4,300	18	9,790	1	3,000
Washington	145	1,802,549	16	125,302			1	8,250					1	600	1	250
West Virginia	308	1,083,612	101	720,260	4	5,650	3	29,275			17	35,470	47	126,581	9	15,730
Wisconsin	221	2,246,992	20	1,202,900	1	19,000					24	80,307	25	150,174	18	69,022
Wyoming	47	199,648	7	86,075	1	2,500					1	1,011				
Puerto Rico	62	1,336,500	33	1,045,000												
Virgin Islands																
DRAINAGE BASIN																
Northeast	846	12,062,583	172	4,602,491	4	22,800	5	73,260	1	585	9	32,552	15	112,008	3	11,817
North Atlantic	1,068	26,636,772	196	11,072,612	10	104,495	7	128,160	2	15,490	17	104,138	79	1,002,812	5	15,935
Southeast	1,109	10,454,357	346	5,625,229	10	330,360	6	184,589	5	72,761	27	415,375	86	249,588	38	979,294
Tennessee River	252	1,520,477	88	1,049,267	1	3,400	1	1,200			1	400	11	22,165		
Ohio River	1,505	12,708,814	443	6,062,911	71	2,481,529	18	220,205	8	187,980	116	927,555	160	552,023	64	247,396
Lake Erie	158	3,751,852	32	2,447,351	31	1,051,252					24	74,097	14	11,430	14	89,882
Upper Mississippi	1,163	12,755,770	131	3,582,084	32	2,877,205	2	28,200	7	247,410	76	450,959	303	632,473	135	420,840
Western Great Lakes	324	6,606,282	77	4,337,098	13	525,508					18	95,[illegible]76	31	156,598	15	215,83
Missouri River	757	4,701,884	164	2,103,350	29	1,134,471	2	1,350	3	115,000	35	76,956	90	257,750	17	105,265
Southwest Lower Mississippi	984	7,343,165	210	2,169,032	52	1,513,869	16	44,555	6	33,090	15	413,719	102	886,346	38	251,670
Colorado River	156	831,043	27	346,414	1	300	1	3,300			5	10,400	1	12,000		
Western Gulf	594	7,100,986	120	2,622,486	12	484,167	6	38,670	4	870,000	6	52,350	8	9,020		
Pacific Northwest	400	3,308,079	42	396,436			1	8,250			1	4,721	2	6,600	1	250
California	377	9,287,024	47	2,307,869	2	791,000	1	35,200			5	108,350	6	21,817		
Great Basin	115	716,808	9	81,710	2	23,500										
Alaska	18	56,330	2	3,130												
Hawaii	23	330,572	6	4,729												
Puerto Rico	62	1,336,500	33	1,045,000												
Virgin Islands																
Total*	9,911	121,508,298	2,145	49,859,199	270	11,343,846	66	766,939	36	1,542,316	355	2,766,848	908	3,932,630	330	2,338,180

*Denotes total for each major division population groups, States, and major drainage basins.

Table 11. *Number of plants and population served by various functional classes of treatment—arranged by population groups, States, and drainage basins*—Continued

Population groups, States, and drainage basins	Disinfection only, or with miscellaneous treatment									Miscellaneous						
	Total		None	Aeration	Corrosion control	Sedimentation	Coagulation sedimentation	Ammonia	Other	Total		Aeration	Corrosion control	Sedimentation	Coagulation sedimentation	Other
	Number of plants	Population served	Number of plants	Number of plants	Number of plants	Number of plants	Number of plants	Number of plants	Number of plants	Number of plants	Population served	Number of plants	Number of plants	Number of plants	Number of plants	Number of plants
POPULATION GROUPS																
Less than 500	1,222	470,641	1,067	13	41	6	1	1	93	59	21,034	6	21	3	.....	29
500–1,000	1,316	1,179,808	1,094	25	70	12	2	.....	113	83	69,748	12	30	1	.....	40
1,000–5,000	1,923	5,276,107	1,431	55	132	17	4	31	253	219	568,747	20	62	1	.....	136
5,000–10,000	396	3,328,804	269	16	28	2	.....	15	66	39	317,443	2	18	.....	.....	19
10,000–25,000	278	4,995,617	171	6	22	2	.....	7	70	26	390,319	.....	17	.....	.....	9
25,000–50,000	104	3,654,505	69	2	6	1	.....	5	21	6	127,400	1	4	.....	.....	1
50,000–100,000	67	4,545,158	37	.....	9	3	.....	1	17	3	122,708	.....	1	.....	.....	2
More than 100,000	59	23,790,301	26	2	5	1	1	9	15	1	100,000	1	.....	.....	.....	.....
STATES																
Alabama	114	410,083	94	6	12	.....	.....	.....	2	15	62,400	.....	2	.....	.....	13
Alaska	16	53,200	15	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Arizona	44	349,373	42	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....
Arkansas	57	152,833	35	.....	11	.....	.....	.....	11	3	1,225	.....	3	.....	.....	.....
California	317	5,941,926	221	6	5	14	3	3	65	27	102,438	1	11	1	.....	14
Colorado	108	382,855	81	.....	2	2	.....	1	22	1	400	.....	1	.....	.....	.....
Connecticut	70	875,668	52	.....	14	.....	.....	.....	4	1	1,600	.....	.....	1	.....	.....
Delaware	17	116,889	13	2	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....
District of Columbia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Florida	227	1,036,449	100	8	23	.....	.....	1	95	22	33,632	4	5	.....	.....	13
Georgia	80	357,385	62	2	4	.....	.....	1	11	13	80,480	1	1	.....	.....	11
Hawaii	17	325,843	11	.....	.....	1	.....	.....	5	.....	.....	.....	.....	.....	.....	.....
Idaho	56	233,730	43	.....	1	.....	.....	.....	12	4	13,400	.....	.....	.....	.....	3
Illinois	195	3,360,641	138	2	34	.....	.....	.....	21	28	48,819	2	16	.....	.....	4
Indiana	181	848,749	141	4	25	.....	.....	.....	11	6	10,582	.....	3	.....	.....	10
Iowa	123	435,205	116	2	3	.....	.....	.....	2	6	11,750	2	.....	.....	.....	4
Kansas	282	342,942	256	.....	16	.....	1	.....	10	1	1,200	.....	.....	.....	.....	1
Kentucky	57	66,215	45	1	.....	.....	.....	.....	10	.....	.....	.....	.....	.....	.....	.....
Louisiana	52	409,850	40	3	3	.....	.....	.....	6	.....	.....	.....	.....	.....	.....	.....
Maine	86	476,226	48	1	12	.....	.....	15	10	1	700	.....	1	.....	.....	.....
Maryland	64	505,325	51	.....	5	1	.....	.....	7	.....	.....	.....	.....	.....	.....	.....
Massachusetts	80	3,488,126	59	.....	13	.....	.....	1	7	41	272,272	.....	32	.....	.....	9
Michigan	85	604,924	55	.....	13	.....	.....	.....	17	27	73,395	.....	16	.....	.....	11
Minnesota	59	383,426	55	.....	1	.....	.....	2	1	25	72,310	.....	9	.....	.....	16
Mississippi	39	292,900	18	4	2	.....	.....	.....	15	19	63,255	10	2	.....	.....	7

Missouri	39	126,560	26	8	1				4	3	7,530					3
Montana	78	228,956	58		1	1		6	12							
Nebraska	6	18,415	4						2	1	6,395					1
Nevada	16	91,673	14	1					1							
New Hampshire	53	324,145	50						3	5	19,369		3			2
New Jersey	171	2,794,579	119	9	9			4	30	8	80,742		5			3
New Mexico	63	526,010	48			10			5	1	800		1			
New York	318	10,111,535	210	5	29	4		10	60	23	252,000	2	4			17
North Carolina	78	284,695	54	1	18			1	4	7	7,540	1	5			1
North Dakota	8	10,145	7			1				6	37,740					6
Ohio	97	643,234	80	5	4				8	13	12,020	5	2			6
Oklahoma	146	342,682	132	2	2	1			9	1	1,000					1
Oregon	143	911,560	129		1	1		4	8	4	11,395	1	1			2
Pennsylvania	474	2,227,881	401	9	18	1	1	3	41	6	15,322	2	1			3
Rhode Island	20	161,515	12		7				1	1	165		1			
South Carolina	16	231,650	11		1				4	15	58,950		13			2
South Dakota	58	133,140	54		2				2	2	4,900					2
Tennessee	111	297,440	82	4	3				22	2	7,900	2				
Texas	412	2,859,805	354	28	10	2	3	1	14	11	12,410	6		1		4
Utah	80	496,514	66		2	2		6	4	3	2,240	1		2		
Vermont	50	130,062	47						3							
Virginia	130	217,011	120	1	3	1			5	3	4,155		3			
Washington	122	1,658,647	100	1	2	1		7	11	4	9,500					4
West Virginia	124	149,146	109	3	1	1			10	3	1,500	1				2
Wisconsin	59	411,621	51	1				1	6	74	313,968	1	12			61
Wyoming	38	110,062	31						7							
Puerto Rico	29	291,500	4						25							
Virgin Islands																
DRAINAGE BASINS																
Northeast	576	6,900,122	413	5	62	3		23	70	61	306,948	1	38	1		21
North Atlantic	731	13,867,507	571	17	39	3	1	9	91	21	325,633	1	9			11
Southeast	512	2,316,409	313	18	56			2	123	79	280,752	10	27			42
Tennessee River	149	443,145	131	1	7				10	1	900					1
Ohio River	604	2,003,011	502	16	36	2	1	2	45	21	26,204	5	5			11
Lake Erie	36	69,934	27	4	1				4	7	7,906	3	1			3
Upper Mississippi	354	4,097,653	282	3	39			1	29	123	418,946	5	36			82
Western Great Lakes	129	1,163,266	93	2	14			2	18	41	111,705		17			24
Missouri River	410	867,217	349	8	14	3		4	32	7	40,525					7
Southwest-Lower Mississippi	523	1,992,199	421	11	24	2	2		63	22	38,685	8	7			7
Colorado River	119	449,502	99			3		2	15	2	9,127		1	1		
Western Gulf	428	3,012,608	366	26	10	11	1	1	13	10	11,685	6		1		3
Pacific Northwest	341	2,857,527	287	1	4	2		14	33	12	34,295	1	1			
California	289	5,920,350	203	6	5	6	3	2	64	27	102,438	1	11	1		14
Great Basin	102	609,948	77	1	2	8		7	7	2	1,650	1		1		
Alaska	16	53,200	15						1							
Hawaii	17	325,843	11			1			5							
Puerto Rico	29	291,500	4						25							
Virgin Islands																
Total*	5,365	47,240,941	4,164	119	313	44	8	69	648	436	1,717,399	42	153	5		236

*Denote total for each major division population groups, States, and major drainage basin.

Table 12. *Number of plants and population served by various types of disinfection—arranged by population groups, States, and drainage basins*

Population groups, States, and drainage basins	Total		Disinfection with—													
			Ammonia chlorine		Liquid chlorine		Hypochlorite		Both liquid chlorine and hypochlorite		Ozone		Other		Unreported method	
	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served
Population Groups																
Less than 500	1,490	631,052	2	350	434	256,040	1,025	365,087	10	2,267	1	330	7	1,587	11	5,391
500–1,000	1,879	1,697,530	10	12,405	771	834,282	1,041	796,084	24	19,083			10	10,098	23	25,578
1,000–5,000	3,345	9,597,012	99	388,208	2,265	7,025,367	849	1,762,383	85	265,679	1	1,500	10	24,063	36	129,812
5,000–10,000	874	7,762,744	71	735,209	712	6,355,055	63	395,328	20	180,352			4	54,000	4	42,800
10,000–25,000	648	12,178,810	83	1,638,295	515	9,742,644	30	346,913	7	130,968			5	115,550	8	204,440
25,000–50,000	272	10,700,809	50	2,238,480	205	7,929,201	8	142,850	5	217,920					4	172,358
50,000–100,000	149	11,964,399	35	3,546,070	99	7,599,794	7	287,915	2	87,720			3	314,510	3	128,390
More than 100,000	188	62,791,507	54	19,521,041	117	38,590,396	6	185,570	4	2,877,500			5	1,438,000	2	179,000
States																
Alabama	230	1,742,583	1	28,000	90	1,574,261	138	139,822	1	500						
Alaska	17	56,200			9	50,275	8	5,925								
Arizona	54	595,473	2	45,300	25	443,260	27	106,913								
Arkansas	142	860,427	3	290,050	101	517,545	36	35,132	1	2,700					1	15,000
California	381	9,241,095	8	322,800	287	5,854,440	54	285,709	10	2,501,418			5	68,625	17	208,103
Colorado	148	1,357,785	11	759,500	82	566,890	54	30,195							1	1,200
Connecticut	94	1,972,544	3	68,670	54	1,537,172	30	51,095	2	307,000					5	8,607
Delaware	22	296,939	1	3,000	19	293,514	2	425								
District of Columbia	2	1,173,000			2	1,173,000										
Florida	304	2,851,471	10	505,470	171	2,221,545	117	81,966	6	42,490						
Georgia	183	2,316,822	10	949,500	132	1,330,567	39	32,755								
Hawaii	22	330,092			10	158,437	10	10,655	2	161,000			2	4,000		
Idaho	63	294,930	2	23,000	41	260,695	19	8,335	1	2,900						
Illinois	461	7,870,678	14	3,164,713	273	4,471,436	105	116,203	7	71,900						
Indiana	305	2,856,865	10	1,106,500	216	1,671,272	73	64,625	5	4,468			1	10,000	2	46,426
Iowa	273	1,409,589	5	200,440	102	1,049,521	159	126,703	3	7,170						
Kansas	385	1,354,066	13	470,340	117	689,259	237	152,807	17	26,660			1	15,000	4	25,755
Kentucky	223	1,683,506	19	912,890	154	727,293	43	35,373	3	3,270			2	2,300	2	2,380
Louisiana	145	2,034,964	9	822,100	107	1,177,134	29	35,730								
Maine	111	677,411	19	241,494	46	353,159	42	77,258	3	5,150			1	50		
Maryland	91	2,219,990	4	99,640	37	1,532,695	45	35,555	4	32,100			1	520,000		
Massachusetts	97	4,040,705	1	1,900,000	73	1,994,330	23	146,375								
Michigan	153	3,909,360	3	279,720	103	3,431,209	44	191,036	1	2,022	1	1,500	1	3,873		
Minnesota	109	1,522,381	13	765,621	55	673,380	41	83,380								
Mississippi	69	667,515	1	140,000	43	495,835	25	31,680								

Missouri	180	3,146,385	7	1,333,275	96	1,345,070	73	160,060	2	6,300			2	301,680		
Montana	91	417,696	16	309,042	43	69,609	31	36,045	1	3,000						
Nebraska	19	500,340	1	128,000	9	339,860	9	32,480								
Nevada	18	97,993	1	55,000	9	32,525	4	4,512							5	8,956
New Hampshire	55	343,430			17	252,865	37	77,565	1	13,000						
New Jersey	221	5,187,204	22	2,869,605	96	1,469,955	70	300,590	10	186,870			1	150	22	360,034
New Mexico	79	597,560			44	540,800	30	22,210	3	31,750			1	1,000	1	1,800
New York	454	12,739,019	41	1,358,537	262	10,927,453	133	292,319	7	15,147			2	11,365	9	134,198
North Carolina	220	2,007,062	13	450,400	149	1,464,787	54	74,975	3	10,400			1	6,500		
North Dakota	27	161,285	6	99,615	12	48,710	7	9,870	1	1,200			1	1,890		
Ohio	300	6,701,868	18	1,977,693	169	4,555,843	109	133,358	4	34,974						
Oklahoma	240	1,581,311	7	97,028	126	1,384,644	101	89,449	2	5,250			1	1,100	3	3,840
Oregon	165	1,156,715	10	656,874	80	435,194	74	44,317			1	330				
Pennsylvania	691	9,247,915	31	1,213,199	368	6,660,263	240	313,480	31	198,395			15	855,038	6	7,540
Rhode Island	30	790,765			9	671,520	21	119,245								
South Carolina	85	1,046,850	12	439,000	64	585,300	8	22,500					1	50		
South Dakota	87	310,825	6	65,700	41	209,060	39	35,740	1	325						
Tennessee	219	1,762,725	1	14,700	162	1,689,100	49	37,075	4	13,350			1	1,500	2	7,000
Texas	578	7,126,125	10	1,054,180	408	5,818,569	156	211,376	3	14,000					1	28,000
Utah	92	539,828	6	125,000	52	376,183	27	27,855	2	3,460					5	7,330
Vermont	55	186,763			22	138,807	33	47,956								
Virginia	221	2,004,199	3	377,300	122	1,411,204	89	60,095	6	4,500			1	151,100		
Washington	139	1,792,654	13	1,043,252	74	687,648	49	58,517	2	3,050			1	187		
West Virginia	283	1,068,350	8	234,800	195	760,365	72	58,335	3	1,750			1	1,300	4	11,800
Wisconsin	103	1,956,757	9	1,074,650	58	793,388	32	37,799	3	49,820			1	1,100		
Wyoming	47	199,648	1	4,460	35	192,433	11	2,755								
Puerto Rico	62	1,336,500			47	1,223,500	12	89,000	2	14,200					1	9,800
Virgin Islands																
DRAINAGE BASINS																
Northeast	757	11,548,345	52	3,154,351	403	7,310,875	273	626,291	12	337,297			3	11,415	14	108,116
North Atlantic	995	25,513,089	61	4,656,626	496	17,985,679	355	765,283	43	395,065			13	1,309,053	27	401,383
Southeast	1,028	10,272,042	46	2,585,070	602	7,258,905	366	364,127	10	53,390			4	10,550		
Tennessee River	251	1,520,162	2	42,700	170	1,404,137	70	49,575	6	15,250			1	1,500	2	7,000
Ohio River	1,358	12,222,931	54	2,897,221	878	8,757,536	390	384,617	22	82,662			6	40,835	8	60,060
Lake Erie	126	3,707,093	9	1,175,930	79	2,312,210	34	37,053	2	1,900			2	180,000		
Upper Mississippi	772	12,059,833	33	5,167,730	409	6,156,021	315	308,151	9	101,750			2	301,100	4	25,08
Western Great Lakes	248	6,402,425	22	1,945,764	157	4,095,520	64	229,746	2	16,022	1	1,500	2	13,873		
Missouri River	694	4,572,333	40	1,393,722	296	2,848,544	340	301,672	15	22,725			2	3,570	1	2,100
Southwest-Lower Mississippi	934	6,753,220	28	1,669,658	544	4,686,545	344	337,227	11	23,650			2	16,100	5	20,040
Colorado River	152	791,116	4	69,800	77	593,222	71	128,094								
Western Gulf	581	7,082,106	9	1,032,400	402	5,767,722	162	208,434	5	42,750			1	1,000	2	29,800
Pacific Northwest	388	3,283,389	28	1,781,826	205	1,361,097	149	127,999	4	8,950	1	330	1	187		
California	347	9,157,829	6	301,800	262	5,826,822	51	280,294	9	2,496,418			5	68,625	14	183,870
Great Basin	113	715,158	10	205,460	72	432,732	15	27,987	3	8,460					13	46,519
Alaska	17	56,200			9	50,275	8	5,925								
Hawaii	22	330,092			10	158,437	10	10,655	2	161,000						
Puerto Rico	62	1,336,500			47	1,223,500	12	89,000	2	14,200					1	9,800
Virgin Islands																
Total*	8,845	117,323,863	404	28,080,058	5,118	78,332,779	3,029	4,282,130	157	3,781,489	2	1,830	44	1,957,808	91	887,769

*Denotes total for each major division, population groups, States, and major drainage basins.

Table 13. *Number of plants and population served by selected unit processes—arranged by population groups, States, and drainage basins*

Population groups, States, and drainage basins	Filtration								Softening			
	Rapid sand-gravity		Slow sand		Rapid sand-pressure		Anthrafilt		Lime-soda		Zeolite	
	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served
POPULATION												
Less than 500	130	96, 782	16	4, 630	157	63, 279	31	10, 668	15	7, 287	46	21, 164
500–1,000	342	316, 786	13	12, 190	204	153, 884	39	45, 183	69	67, 053	123	97, 403
1,000–5,000	979	3, 003, 481	31	96, 833	234	555, 640	117	445, 526	202	615, 131	199	473, 939
5,000–10,000	346	3, 175, 565	7	60, 315	36	351, 829	59	602, 605	88	786, 298	22	179, 565
10,000–25,000	278	5, 383, 608	16	306, 777	19	326, 436	39	775, 271	85	1, 525, 492	18	357, 047
25,000–50,000	133	5, 681, 041	7	303, 510	7	308, 000	20	775, 740	35	1, 603, 580	6	211, 260
50,000–100,000	72	6, 672, 531			2	327, 720	11	1, 112, 190	14	1, 334, 870		
More than 100,000	107	34, 543, 621	16	5, 449, 365	8	1, 042, 070	14	3, 369, 900	32	9, 529, 651	2	870, 000
STATES												
Alabama	81	1, 247, 171	5	14, 141	10	12, 748					3	1, 520
Alaska	5	234, 000	2	29, 800								
Arizona	56	563, 170	1	400	17	23, 431	6	84, 126	14	62, 720	3	5, 700
Arkansas	54	2, 201, 451	2	56, 932	11	222, 661	1	11, 500	6	104, 090		
California	34	674, 265	2	155, 600	10	14, 265	3	173, 500			1	770, 000
Colorado	17	350, 355	4	729, 065	3	14, 200	1	14, 000	1	3, 396	3	22, 200
Connecticut	2	159, 000			1	2, 000						
Delaware	1	546, 400	1	626, 600			1	546, 400				
District of Columbia	44	1, 399, 536			4	7, 187	19	358, 305	44	1, 494, 915	8	104, 060
Florida	80	1, 776, 257			3	555, 000	8	60, 100	7	43, 890	2	975
Georgia	2	2, 265	6	144, 388								
Hawaii	5	51, 200	1	120	1	7, 000						
Idaho	138	4, 043, 294	1	800	83	387, 812	19	180, 327	42	626, 596	91	225, 732
Illinois	53	1, 725, 309			33	104, 544	3	51, 100	5	212, 750	29	94, 646
Indiana	67	834, 981	2	74, 050	138	137, 693	37	50, 408	25	483, 051	32	31, 325
Iowa	86	951, 254	2	550	6	30, 450	3	142, 600	35	645, 170	5	4, 740
Kansas	139	1, 551, 734	4	20, 950	10	9, 630	3	556, 000	18	666, 490	1	800
Kentucky	58	1, 392, 504	3	8, 100	7	25, 395	15	275, 400	52	1, 126, 284	10	11, 410
Louisiana	13	80, 675	4	16, 000	5	35, 333					1	500
Maine	11	1, 626, 740			9	19, 125	1	48, 640	1	48, 640	2	2, 485
Maryland	8	304, 583	17	313, 650	2	38, 871					1	6, 126
Massachusetts	53	3, 192, 712			22	38, 568	1	103, 000	12	634, 978	13	80, 165
Michigan	95	607, 360			31	55, 580	11	56, 320	4	904, 300	7	8, 235
Minnesota	9	306, 585			20	40, 800	1	30, 000	2	30, 800	1	20, 000
Mississippi	108	2, 951, 075	1	1, 860	6	5, 740	2	3, 350	15	2, 388, 110	22	33, 885
Missouri	12	183, 240	2	2, 200			2	67, 500	2	17, 500		
Montana	22	510, 575			5	6, 255	1	960	5	19, 630	2	1, 875
Nebraska	1	3, 300			1	3, 020						
Nevada	3	7, 270	3	20, 099							1	15, 911
New Hampshire												

New Jersey	27	2,117,003	2	8,000	28	447,107	16	99,840			2	16,900
New Mexico	12	55,550	1	100	2	14,900			1	100	1	2,000
New York	56	1,966,886	11	259,538	13	403,123	23	803,387	3	55,358	16	44,773
North Carolina	71	1,298,537	3	17,230	8	15,020	14	110,300	3	24,800	9	43,200
North Dakota	22	162,946							8	109,921	1	1,000
Ohio	215	5,939,523	1	200	41	44,259	2	375,000	141	2,752,885	52	247,764
Oklahoma	56	675,322	6	35,750	2	1,250	25	559,873	9	442,550		
Oregon	14	149,934			3	36,200	2	7,721	1	4,721		
Pennsylvania	124	5,051,304	9	2,910,030	3	55,000	38	1,009,790	30	815,955	25	274,913
Rhode Island	7	614,770			3	14,480					1	50
South Carolina	51	669,100			2	30,350	17	330,000			3	9,100
South Dakota	18	70,310			11	11,620	6	98,600	9	140,350	3	5,200
Tennessee	66	1,781,770	1	350	12	25,965	5	48,900			3	4,590
Texas	109	3,810,098	4	672,500	33	63,587	9	344,850	16	1,443,162	5	23,255
Utah	2	2,500			3	454	1	35,000			1	300
Vermont	4	49,301			1	7,400						
Virginia	80	1,685,484	1	38,000	6	59,350	13	182,730	3	22,000	9	8,860
Washington	13	95,171	1	477	1	10,000	4	42,631			3	2,914
West Virginia	111	738,214			33	49,830	15	269,775	14	31,700	13	25,300
Wisconsin	31	1,344,430	2	76,000	21	32,880	2	5,150	11	110,050	31	57,969
Wyoming	9	77,001	1	140	2	3,775						
Puerto Rico	32	1,040,000			1	5,000			1	2,500		
Virgin Islands												
Drainage Basins												
Northeast	101	3,024,440	36	1,281,952	22	303,663	20	737,864	3	29,396	18	61,760
North Atlantic	150	9,952,036	12	2,982,830	51	782,326	44	1,322,740	11	134,133	21	80,865
Southeast	327	6,678,213	7	18,891	34	640,330	59	859,585	55	1,576,105	25	158,855
Tennessee River	67	887,743	2	12,830	11	26,815	4	58,400	1	400	2	4,400
Ohio River	567	8,521,960	9	677,350	120	205,188	48	1,367,428	162	3,378,448	97	482,546
Lake Erie	71	3,124,559			14	12,059	3	495,000	43	1,087,628	25	113,711
Upper Mississippi	281	6,804,262	4	114,850	219	554,648	60	262,315	81	3,557,276	142	305,335
Western Great Lakes	93	4,986,633	1	36,000	30	68,451	2	135,500	16	704,828	28	112,157
Missouri River	224	3,243,822	6	158,150	58	82,140	21	470,650	49	1,394,271	29	48,780
Southwest-Lower Mississippi	264	4,174,588	10	44,250	55	96,458	53	984,934	96	2,164,804	16	39,000
Colorado River	18	313,960	2	29,800	8	6,244						
Western Gulf	162	3,618,678	5	672,600	27	66,655	7	340,315	16	1,333,262	4	6,000
Pacific Northwest	32	296,305	4	2,797	5	53,200	7	55,852	1	4,721	5	24,055
California	48	2,139,761	2	56,932	11	222,661	1	11,500	4	80,590	1	2,914
Great Basin	8	64,190			1	3,020	1	35,000	2	23,500		770,000
Alaska												
Hawaii	2	2,265	6	144,388								
Puerto Rico	32	1,040,000										
Virgin Islands					1	5,000						
Total*	2,387	58,873,415	106	6,233,620	667	3,128,858	330	7,137,083	540	15,469,362	416	2,210,378

*Denote total for each major division, population groups, States, and major drainage basins.

Table 13. *Number of plants and population served by selected unit processes—arranged by population groups, States, and drainage basins*—Continued

Population groups, States and drainage basins	Aeration		Taste and odor control		Corrosion control		Laboratory control (at plant)		
	Number of plants	Population served	Number of plants	Population served	Number of plants	Population served	Chemical	Bacteriological	Both
POPULATION GROUPS									
Less than 500	301	125,188	20	47,175	180	118,605	124	37	13
500–1,000	490	388,878	89	102,082	338	292,457	288	56	41
1,000–5,000	883	2,496,160	384	1,344,393	846	2,702,724	795	97	247
5,000–10,000	219	1,973,859	199	1,935,693	272	2,668,102	210	32	210
10,000–25,000	158	3,029,412	185	3,588,029	218	4,283,558	121	39	241
25,000–50,000	80	3,185,785	94	4,317,464	100	3,834,673	27	32	148
50,000–100,000	30	2,736,531	51	4,964,591	57	4,978,519	6	22	88
More than 100,000	34	5,852,330	75	23,980,721	78	23,924,716	5	12	133
STATES									
Alabama	46	282,345	6	58,806	94	1,269,466	73	3	1
Alaska									
Arizona	1	6,000	4	206,000	1	4,600	4		4
Arkansas	64	274,947	17	407,271	35	356,034	43		17
California	47	1,293,500	28	1,213,845	71	2,426,288	13	69	59
Colorado	6	174,025	27	1,015,200	5	22,100	11	1	3
Connecticut	17	707,911	7	117,935	34	1,118,886	7	4	10
Delaware	8	30,100	1	18,950	2	4,450	2	3	1
District of Columbia			2	1,173,000	2	1,173,000			2
Florida	168	1,642,726	15	528,917	76	595,112	30	2	34
Georgia	19	111,245	39	1,260,780	70	1,733,227	62	2	30
Hawaii	2	138,025	1	1,740	1	137,500			1
Idaho	1	5,000	3	40,500	2	19,200	3		3
Illinois	218	671,683	109	3,890,788	145	2,969,285	194	3	75
Indiana	78	469,459	18	1,378,719	45	344,840	39	8	31
Iowa	195	399,078	28	561,761	74	498,054	36	17	10
Kansas	55	471,510	47	580,440	32	386,125	50		10
Kentucky	49	491,653	75	1,239,700	62	946,488	63	4	22
Louisiana	60	495,745	27	458,140	32	1,170,560	68		13
Maine	4	53,750	7	103,000	28	246,735	4	2	12
Maryland	12	86,575	3	84,040	29	2,073,485	29		7
Massachusetts	16	488,091	5	134,275	61	824,730	5	2	10
Michigan	33	183,416	19	2,768,432	58	598,575	43	17	59
Minnesota	113	580,455	5	590,400	49	253,820	9		12
Mississippi	60	247,145	4	250,000	39	296,630	11		1
Missouri	95	377,805	4	184,575	13	802,810	65	2	20
Montana	5	11,447	10	177,845	7	95,680	6	5	6
Nebraska	28	192,850	1	325,000	1	325,000	6		1
Nevada	2	3,750	1	3,300			3	6	1
New Hampshire	2	19,835	1	1,500	6	33,955			

New Jersey	75	1,069,804	21	1,956,273	65	3,087,543	27	13	43
New Mexico			4	14,800	4	69,800	3	2	5
New York	82	1,638,874	82	1,476,260	132	1,988,113	32	23	85
North Carolina	28	87,150	50	1,179,784	135	1,727,369	23	1	91
North Dakota	6	62,100	4	85,500	3	67,006	3		5
Ohio	140	643,591	83	5,056,822	119	3,867,712	110	4	114
Oklahoma	31	159,993	50	693,401	13	624,931	72		7
Oregon	3	27,995	11	91,485	7	20,080	17	10	2
Pennsylvania	51	697,805	100	2,769,738	110	3,310,467	72	90	87
Rhode Island	5	566,420	6	199,670	14	275,939	2	2	
South Carolina	10	205,600	20	469,900	84	1,048,750	26		30
South Dakota	21	42,050	8	76,550	10	115,480	13		1
Tennessee	62	1,066,247	12	381,406	64	859,442	60	1	52
Texas	113	1,184,010	51	2,720,471	29	1,636,945	17	8	64
Utah	1	1,150	2	36,000	3	110,200		1	2
Vermont									
Virginia			2	15,134				1	
Washington	32	922,499	32	1,489,270	58	1,666,575	40		15
West Virginia	2	22,800	1	686,300	10	120,630	17	6	7
Wisconsin	77	583,242	22	544,700	43	465,914	54	8	23
	49	448,342	18	1,208,725	49	132,223	75	7	17
Wyoming	1	42,000	3	24,166	1	6,000	9		
Puerto Rico	2	406,400	1	338,000	32	875,600	25		10
Virgin Islands									
Drainage Basins									
Northeast	92	2,390,687	87	1,570,942	227	3,528,941	38	27	96
North Atlantic	170	3,423,648	112	6,207,730	227	10,084,545	123	94	130
Southeast	297	2,500,786	135	3,711,977	477	6,552,879	216	7	190
Tennessee River	28	66,364	7	370,400	57	914,536	44	1	36
Ohio River	369	2,834,353	243	6,277,918	314	6,040,891	319	39	209
Lake Erie	47	150,066	44	3,420,712	37	1,559,153	33	1	48
Upper Mississippi	482	1,730,999	106	4,729,948	284	3,802,304	276	21	82
Western Great Lakes	52	478,352	47	4,558,183	67	759,320	61	22	88
Missouri River	216	856,792	76	2,030,435	68	1,465,321	118	7	31
Southwest-Lower Mississippi	275	2,320,966	134	2,178,302	174	2,783,546	244	3	61
Colorado River	2	9,300	9	261,100	2	16,600	7	2	6
Western Gulf	105	1,119,010	48	2,536,531	28	1,580,320	19	9	60
Pacific Northwest	7	61,295	17	836,385	20	165,410	37	18	12
California	45	1,286,600	26	1,203,145	70	2,410,288	11	63	53
Great Basin	4	8,500	4	46,700	4	126,200	5	13	8
Alaska									
Hawaii									
Puerto Rico	2	138,025	1	1,740	1	137,500			1
Virgin Islands	2	406,400	1	338,000	32	875,600	25		10
Total*	2,195	19,788,143	1,097	40,280,148	2,089	42,803,354	1,576	327	1,121

*Denotes total for each major division, population groups, States, and major drainage basins.

II. ANALYSIS AND DISCUSSION

Water Supplies

General

In the field of water supply and treatment, comparisons of detailed statistical data are valuable considerations. These comparisons take on special significance when analyzed with respect to time. Using Thoman's (*2*) comprehensive study and analysis of the 1948 statistical data as a basis of comparison, it is possible to show the growth in water facilities and trends in treatment processes for a period of 10 years. For this reason, this analysis and discussion will closely parallel the summary prepared by Thoman (*2*).

In 1958 there were 17,808 water facilities serving 20,459 communities in the United States. This represents an increase of 22 percent in com munities served by water supplies during the 10-year period. During the same period the population served rose from 93.5 million to 133.1 million, a 42.4 percent increase. This population represented 77 percent of the total estimated population in the country in 1958. In 1948, 65 percent of the total population was connected to public water supplies.

A total of 66.1 percent of the communities were served by ground sources, 26.6 percent were by surface supplies, and 7.3 percent were served by both ground and surface sources. Overall, 62.1 percent of the communities were served with treated water, 36.5 percent were served with untreated water, while only 1.4 percent were served both treated and untreated water in combination.

Although decreasing by almost 4 percent since 1948, surface sources served the greatest number of the population (50.8 percent). Population served with treated water increased 11.4 percent, making a national total of 90 percent of the total population being so served. Only 7.7 percent of the total population served received untreated water as the sole supply, but as noted above this occurred in over 36.5 percent of the communities served by public water supplies.

There were 9,911 facilities providing some type of treatment and serving more than 121,508,000 persons in the United States in 1958. As in 1948, simple disinfection plants were the largest single type. However, considering population served, rapid sand purification plants served slightly more people than plants with disinfection alone or disinfection combined with some miscellaneous process. The percentages of population served were 41.0 percent for purification plants and 38.9 percent for disinfection plants. A complete summary of national totals is shown in table 2.

Some type of disinfection was used in 8,845 facilities serving over 117,323,000 persons. Liquid chlorine was used as the disinfecting agent in the greatest number of facilities and for the largest percentage of the population served.

Table 14 shows the percentage distribution by States of facilities and population served arranged by source of supply and treatment. As

would be expected, the data shows wide variations among the States regarding both source and/or treatment. In Nebraska, for example, 98.6 percent of the facilities receive their water supplies from ground sources, and 8.8 percent of the facilities provide treatment. By contrast, in the State of Maine, only 37.9 percent of the facilities utilize ground sources, but 63.8 percent of the supplies are treated.

On a population basis the majority of the people receives water from surface sources in most of the States, and in all States more people are served by treated supplies than by untreated ones. In Florida 83.4 percent of the population is served by ground sources, as contrasted with Connecticut where only 5.4 percent of the population receives water from ground sources. Only in the District of Columbia does the population receive 100 percent treated water. Maryland with 99.4 percent of the total population receiving treated water is second, followed by Kentucky with 98.7 percent.

In 1958 there were 310 facilities in 29 States serving untreated water from surface sources. This rather large number of facilities, however, serves only 327,000 people. California, which reported 63 facilities, had the largest number of such situations. Percentagewise, this type of supply constituted 9.2 percent of the number of facilities relying on surface supplies, but serving only 0.4 percent of the total population connected to surface sources.

There were 7,475 facilities reported serving untreated water from ground sources. A total of over 10,961,000 persons received untreated water from these facilities. All States reported systems in this category and in 33 States the number of facilities serving untreated ground water exceed those serving treated water from ground sources. Untreated ground water supplies served 55 percent of the facilities served by ground sources, and 24 percent of the population. In fact, over 42 percent of all facilities in the United States served untreated ground water.

Population Groups

Table 15 shows the percent of facilities and population served by source of supply and treatment as arranged by population groups. A majority of the under-25,000 population places are served by ground sources while surface sources predominate in the larger communities. Approximately 67 percent of facilities serving less than 500 people deliver untreated water, and considering all facilities serving untreated water, over 93 percent are facilities serving less than 5,000 population. As expected, the percentage of facilities serving untreated water decreases as the community size increases, yet over one-third of the places in the 1,000–5,000 population category are served untreated water. The same trends are reflected with respect to the population served. In the places of smaller population, ground supplies are most common, and untreated water is supplied to the largest percentages of population served. Facilities dependent upon surface sources serve the highest percentage of the

Table 14. *Percent of facilities and population served by source of supply and treatment—arranged by States*

States	Percent of total facilities served by—			Percent of total facilities served by—			
	Ground sources	Surfaces sources	Both ground and surface sources	Treated supplies	Untreated supplies	Both treated and untreated supplies	Treatment if any, not reported
Alabama	75.3	22.3	2.4	79.7	19.6	.7	.....
Alaska	26.8	58.6	14.6	41.5	56.1	2.4	.....
Arizona	93.7	5.6	.7	39.4	60.6	.....	.....
Arkansas	79.6	16.8	3.6	71.8	28.2	.....	.....
California	78.0	14.8	7.2	27.3	72.0	.6	.1
Colorado	62.7	31.6	5.7	52.7	46.6	.7	.....
Connecticut	51.0	29.3	19.7	65.3	34.7	.....	.....
Delaware	87.9	9.1	3.0	75.8	24.2	.....	.....
District of Columbia	.....	100.0	.....	100.0	.....	.....	.....
Florida	96.1	3.7	.2	69.7	29.7	.6	.....
Georgia	77.5	19.1	3.4	50.5	49.5	.....	.....
Hawaii	67.1	27.8	5.1	29.1	70.9	.....	.....
Idaho	74.2	20.1	5.7	30.6	68.9	.5	.....
Illinois	85.4	13.9	.7	67.0	33.0	.....	.....
Indiana	86.6	11.8	1.6	85.2	14.8	.....	.....
Iowa	93.7	5.4	.9	54.4	45.2	.4	.....
Kansas	82.9	13.7	3.4	88.6	11.4	.....	.....
Kentucky	45.4	46.8	7.8	83.6	16.4	.....	.....
Louisiana	85.0	14.6	.4	53.8	46.2	.....	.....
Maine	37.9	54.0	8.1	63.8	36.2	.....	.....
Maryland	72.3	20.5	7.2	83.9	16.1	.....	.....
Massachusetts	58.0	26.7	15.3	55.7	41.6	2.7	.....
Michigan	84.2	14.4	1.4	39.4	60.6	.....	.....
Minnesota	95.1	4.7	.2	40.3	59.7	.....	.....
Mississippi	98.2	1.3	.5	41.1	58.5	.4	.....
Missouri	78.1	21.6	.3	53.6	46.4	.....	.....
Montana	68.5	21.6	9.9	56.8	43.2	.....	.....
Nebraska	98.6	1.4	.....	8.8	91.2	.....	.....
Nevada	69.6	15.2	15.2	39.1	60.9	.....	.....
New Hampshire	46.9	47.7	5.4	49.2	50.8	.....	.....
New Jersey	84.7	7.4	7.9	71.4	28.0	.6	.....
New Mexico	90.2	6.2	3.6	40.9	58.6	.5	.....
New York	53.6	39.6	6.8	63.8	35.8	.4	.....
North Carolina	61.7	36.4	1.9	61.7	37.8	.5	.....
North Dakota	89.3	7.6	3.1	23.9	76.1	.....	.....
Ohio	74.7	19.3	5.5	77.4	22.6	.....	.....
Oklahoma	73.4	22.6	4.0	61.2	38.8	.....	.....
Oregon	54.5	35.8	9.7	54.8	43.5	1.7	.....
Pennsylvania	54.8	33.2	12.0	75.1	24.3	.6	.....
Rhode Island	74.5	17.0	8.5	68.1	31.9	.....	.....
South Carolina	69.4	27.2	3.4	53.4	46.6	.....	.....
South Dakota	93.8	5.4	.8	40.9	59.1	.....	.....
Tennessee	76.5	17.3	6.2	86.9	13.1	.....	.....
Texas	84.3	13.6	2.1	55.3	44.7	.....	.....
Utah	77.8	13.8	8.4	29.7	70.3	.....	.....
Vermont	58.7	24.5	16.8	33.6	64.5	1.9	.....
Virginia	77.4	18.4	4.2	50.1	49.1	.8	.....
Washington	71.0	21.0	8.0	33.4	66.1	.5	.....
West Virginia	68.8	27.9	3.3	72.8	27.2	.....	.....
Wisconsin	94.4	5.3	.3	53.3	46.5	.2	.....
Wyoming	63.2	26.3	10.5	49.5	50.5	.....	.....
Puerto Rico	35.5	64.5	.....	100.0	.....	.....	.....
Virgin Islands	66.7	33.3	.....	.....	100.0	.....	.....
Total	76.4	18.9	4.7	55.3	44.3	.3	.1

Table 14. *Percent of facilities and population served by source of supply and treatment—arranged by States*—Continued

States	Percent of total estimated population served by—			Percent of total estimated population served by—			
	Ground sources	Surfaces sources	Both ground and surface sources	Treated supplies	Untreated supplies	Both treated and untreated supplies	Treatment if any, not reported
Alabama	36.8	58.6	4.6	90.8	7.6	1.6	.....
Alaska	18.0	32.8	49.2	68.0	22.4	9.6	.....
Arizona	68.0	32.0	Neg	78.3	21.7	.....	.....
Arkansas	47.1	40.1	12.8	89.8	10.2	.....	.....
California	38.2	36.3	25.5	72.1	26.2	1.1	.6
Colorado	21.0	72.9	6.1	92.3	7.6	.1	.....
Connecticut	5.4	66.7	27.9	96.1	3.9	.....	.....
Delaware	45.7	53.9	.4	93.0	7.0	.....	.....
District of Columbia	.....	100.0	.....	100.0	.....	.....	.....
Florida	83.4	16.3	.3	95.0	4.6	.4	.....
Georgia	27.1	70.7	2.2	92.4	7.6	.....	.....
Hawaii	58.6	5.6	35.8	72.4	27.6	.....	.....
Idaho	65.7	14.0	20.3	70.0	29.3	.7	.....
Illinois	25.3	73.1	1.6	95.2	4.8	.....	.....
Indiana	45.6	49.2	5.2	96.8	3.2	.....	.....
Iowa	61.0	24.5	14.5	86.3	13.6	.1	.....
Kansas	53.4	32.0	14.6	97.3	2.7	.....	.....
Kentucky	14.6	82.5	2.6	98.7	1.3	.....	.....
Louisiana	42.9	56.9	.2	90.2	9.8	.....	.....
Maine	11.6	78.8	9.6	92.7	7.3	.....	.....
Maryland	8.6	90.5	.9	99.4	.6	.....	.....
Massachusetts	17.1	74.0	8.9	90.9	7.4	1.7	.....
Michigan	28.4	69.0	2.6	90.0	10.0	.....	.....
Minnesota	43.8	38.6	17.6	86.6	13.4	.....	.....
Mississippi	73.8	21.0	5.2	76.2	20.7	3.1	.....
Missouri	16.9	80.0	3.1	94.7	5.3	.....	.....
Montana	23.6	55.1	21.3	86.8	13.2	.....	.....
Nebraska	64.4	35.6	.....	58.6	41.4	.....	.....
Nevada	42.2	19.9	37.9	52.4	47.6	.....	.....
New Hampshire	33.4	54.7	11.9	82.2	17.8	.....	.....
New Jersey	35.1	42.6	22.3	94.1	5.6	.3	.....
New Mexico	78.5	8.1	13.4	86.2	9.7	4.1	.....
New York	44.7	53.8	1.5	96.3	3.6	.1	.....
North Carolina	16.9	82.0	1.1	93.3	6.6	.1	.....
North Dakota	50.2	39.3	10.5	70.3	29.7	.....	.....
Ohio	27.4	68.3	4.3	97.7	2.3	.....	.....
Oklahoma	29.3	49.9	20.8	90.6	9.4	.....	.....
Oregon	20.3	74.5	5.2	87.9	11.9	.2	.....
Pennsylvania	10.3	81.9	7.8	97.4	2.2	.4	.....
Rhode Island	14.9	67.2	17.9	96.3	3.7	.....	.....
South Carolina	27.3	66.1	6.6	87.8	12.2	.....	.....
South Dakota	77.5	19.0	3.5	83.2	16.8	.....	.....
Tennessee	45.2	48.9	5.9	98.1	1.9	.....	.....
Texas	46.0	30.0	24.0	91.5	8.5	.....	.....
Utah	41.7	40.3	18.9	74.5	25.5	.....	.....
Vermont	20.2	55.9	23.9	76.2	21.2	2.6	.....
Virginia	15.0	75.4	9.6	93.5	6.3	.2	.....
Washington	35.3	53.0	11.7	80.8	19.1	.1	.....
West Virginia	34.5	58.6	6.9	95.5	4.5	.....	.....
Wisconsin	48.5	51.1	.4	91.1	8.7	.2	.....
Wyoming	40.0	26.7	33.3	83.1	16.9	.....	.....
Puerto Rico	18.0	82.0	.....	100.0	.....	.....	.....
Virgin Islands	34.6	65.4	.....	.....	100.0	.....	.....
Total	33.7	56.7	9.6	90.9	8.7	3	.1

Table 15. *Percent of facilities and population served by source of supply and treatment—arranged by population groups*

Population group	Percent of total facilities served by—			Percent of total facilities served by—			Treatment, if any, not reported
	Ground sources	Surface sources	Both ground and surface sources	Treated supplies	Untreated supplies	Both treated and untreated supplies	
Less than 500	86.8	11.0	2.2	32.7	67.1	0.2	.....
500–1,000	83.4	13.8	2.8	52.4	47.4	.2	.....
1,000–5,000	73.3	20.8	5.9	65.6	34.1	.3	.....
5,000–10,000	58.6	31.6	9.8	79.0	20.5	.5	.....
10,000–25,000	56.5	33.3	10.2	76.2	22.9	.9	.....
25,000–50,000	49.4	41.6	9.0	80.8	18.6	.6	.....
50,000–100,000	42.0	49.2	8.8	81.4	18.0	.0	0.6
More than 100,000	23.4	70.6	9.0	96.5	3.5	.0	.....
Total	76.4	18.9	4.7	55.3	44.3	.3	.1

Population group	Percent of total estimated population served by—			Percent of total estimated population served by—			Treatment, if any, not reported
	Ground sources	Surface sources	Both ground and surface sources	Treated supplies	Untreated supplies	Both treated and untreated supplies	
Less than 500	81.8	14.7	3.5	40.2	59.5	0.3	.....
500–1,000	79.9	15.7	4.4	57.5	42.2	.3	.....
1,000–5,000	69.0	23.7	7.3	70.8	28.8	.4	.....
5,000–10,000	53.9	35.3	10.8	84.7	14.8	.5	.....
10,000–25,000	49.4	39.0	11.6	85.3	13.2	1.5	.....
25,000–50,000	39.1	50.4	10.5	92.6	6.7	.7	.....
50,000–100,000	28.8	61.2	10.0	95.1	4.2	.0	0.7
More than 100,000	15.0	75.2	7.8	99.8	0.2	.0	.....
Total	33.7	56.7	9.6	90.9	8.7	.3	.1

population and the largest populations receive treated water. The facilities serving the larger communities (those of over 100,000 population) make up only 1.1 percent of the total facilities, but serve almost 50 percent of the total population.

There are in the country 310 facilities which serve communities from untreated surface supplies. Fifty-eight percent of these facilities serve communities of less than 500 population, while 97 percent of the facilities serve communities of less than 5,000.

Major Basins

Percentage data for the 15 major drainage basins (figure 2), showing the number of facilities and population served by source of supply and treatment, if any, are given in table 16. The wide variations, evident when the same data are considered by the individual States, are smoothed considerably and a smoother and a more rounded picture results from this type of analysis. This type of analysis also shows distinctive differences in water supply practice in various parts of the country. In com-

Table 16. *Percent of facilities and population served by source of supply and treatment—arranged by major basins*

Major basin	Percent of total facilities served by—			Percent of total facilities served by—			Treatment if any, not reported
	Ground sources	Surface sources	Both ground and surface sources	Treated supplies	Untreated supplies	Both treated and untreated supplies	
Northeast	50.2	38.6	11.2	59.2	40.1	0.7	.....
North Atlantic	69.8	21.6	8.6	65.4	33.9	.7	.....
Southeast	79.9	18.1	2.0	60.6	38.8	.6	.....
Tennessee River	66.2	27.5	6.3	87.8	12.2	.....	.....
Ohio River	67.8	26.9	5.3	78.6	21.2	.2	.....
Lake Erie	63.8	30.8	5.4	84.0	16.0	.....	.....
Upper Mississippi	92.6	6.8	0.6	53.2	46.8	.....	.....
Western Great Lakes	82.5	16.4	1.1	46.3	53.5	.2	.....
Missouri River	86.5	11.2	2.3	43.7	56.0	.3	.....
Southwest-Lower Mississippi	82.0	15.6	2.4	60.9	39.0	.1	.....
Colorado River	72.4	23.4	4.2	43.5	56.5	.....	.....
Western Gulf	85.8	11.6	2.6	53.5	46.4	.1	.....
Pacific Northwest	65.3	26.4	8.3	41.3	58.0	.7	.....
California	78.7	13.8	7.5	27.7	71.7	.6	0.1
Great Basin	77.6	14.4	8.0	26.6	72.9	.5	.....
Total*	76.4	18.9	4.7	55.3	44.3	.4	.1

Major basin	Percent of total population served by—			Percent of total population served by—			Treatment if any, not reported
	Ground sources	Surface sources	Both ground and surface sources	Treated supplies	Untreated supplies	Both treated and untreated supplies	
Northeast	14.2	74.4	11.4	93.0	6.3	0.7	.....
North Atlantic	32.0	60.4	7.6	96.4	3.5	.1	.....
Southeast	43.8	53.4	2.8	91.2	8.2	.6	.....
Tennessee River	28.5	64.5	7.0	98.3	1.7	.0	.....
Ohio River	31.7	62.6	5.7	96.8	2.9	.3	.....
Lake Erie	7.4	88.6	4.0	99.0	1.0	.0	.....
Upper Mississippi	33.3	61.4	5.3	92.4	7.6	.0	.....
Western Great Lakes	27.3	70.8	1.9	92.4	7.5	.1	.....
Missouri River	39.6	53.5	6.9	85.0	14.9	.1	.....
Southwest-Lower Mississippi	51.8	39.7	8.5	90.6	9.4	<.1	.....
Colorado River	61.5	36.9	1.6	73.1	26.9	.0	.....
Western Gulf	47.4	27.3	25.3	91.3	8.3	.4	.....
Pacific Northwest	32.6	56.0	11.4	82.3	17.5	.2	.....
California	37.7	36.5	25.8	72.9	25.4	1.1	0.6
Great Basin	44.7	34.9	20.4	66.8	32.8	.4	.....
Total*	33.7	56.7	9.6	90.9	8.7	.3	.1

*Percentage totals include the States of Alaska, Hawaii and the territories of Puerto Rico and the Virgin Islands.

parison with the 1948 data (*2*), the national ratio of facilities utilizing ground sources to those served by surface supplies has not increased greatly, being 2.4:1 in 1958 and 2.1:1 in 1948. The Upper Mississippi Basin shows the highest ratio, almost 14:1 for ground sources, while the Northeast Basin with a ratio of less than 2:1 is the lowest reported figure of ground sources to surface sources used. The Northeast Basin with 11.2 percent has the greatest number of facilities utilizing both ground and surface sources and the Upper Mississippi Basin with 0.6

percent has the least number of facilities having both ground and surface sources.

While in all basins the number of ground sources exceeds the number of surface sources, in 10 of the 15 major basins, more population is served from surface sources than from ground sources. The Northeast Basin with 74.4 percent has the largest population served from surface sources while the Western Gulf Basin has the lowest population served from surface supplies (27.3 percent). Three basins, the Western Gulf, the California, and the Great Basin, were served with more than 20 percent from both ground and surface sources.

With respect to facilities serving treated water, the Tennessee River Basin leads with 87.8 percent followed by Lake Erie with 84.0 percent. In six basins more than 50 percent of the facilities furnished untreated water. However, in no instance in any basin does the population receiving untreated water exceed that served by treated supplies. Only three basins, the Colorado River Basin, the California Basin, and the Great Basin, fall below 80 percent on being served from treated supplies. The California Basin with 1.1 percent is the only basin being served more than 1 percent of both treated and untreated water from the same facilities.

Ownership

Data on the ownership of water supplies show that in 72.2 percent of the facilities the supplies are publicly owned, in 27.2 percent they are privately owned, and in 0.6 percent of the facilities, the supplies are both publicly and privately owned. These percentages are based upon facilities for which such data are available. Percentage data for each population group, State and major drainage basin are shown in table 17. West Virginia has the highest percentage (74.9) of private supplies, while Nebraska and North Dakota with less than 1 percent are the lowest. California with 624 facilities being privately owned has the largest number and these constitute almost 14 percent of the total number of privately owned facilities in the United States.

With regard to population groups, the largest percentage of privately owned supplies is in facilities serving less than 500 population. The largest percentage of public water supplies is in those of 100,000 population and over group.

In the 500 population and less group, the high percentages of privately owned facilities are due to a large extent by the large number of mill villages and "company" towns. Since World War II, there have been numerous housing developments consisting of less than 500 population in all parts of the country where the developers have retained ownership of the water supplies, contributing to a greater number of privately owned facilities in this population group.

In the major basin area, the North Atlantic Drainage Basin with 48.9 percent has the largest number of privately owned water supplies.

Table 17. *Percent of known ownership of facilities and population—served by publicly owned, privately owned and both publicly and privately owned water supplies arranged by population groups, States, and drainage basins*

Population groups	Public		Private		Both public and private	
	Facilities	Population served	Facilities	Population served	Facilities	Population served
Less than 500	61.5	64.8	38.1	34.6	.4	.6
500–1,000	72.0	74.6	27.4	24.7	.6	.7
1,000–5,000	78.4	81.5	21.0	17.9	.6	.6
5,000–10,000	82.0	84.3	17.3	15.2	.7	.5
10,000–25,000	79.3	84.1	19.8	15.2	.9	.7
25,000–50,000	73.4	80.8	26.0	18.7	.6	.5
50,000–100,000	75.4	76.7	24.6	23.3	.....	.....
More than 100,000	77.2	88.1	22.8	11.9	.....	.....
STATES						
Alabama	75.9	89.1	23.7	10.8	.4	.1
Alaska	71.1	84.3	28.9	15.7	.....	.....
Arizona	35.7	77.8	62.9	21.9	1.4	.3
Arkansas	78.4	78.9	17.8	16.8	3.8	4.3
California	56.4	78.6	43.5	21.4	.1	neg
Colorado	86.8	91.0	13.2	9.0	.....	.....
Connecticut	24.7	47.9	73.3	52.0	2.0	.1
Delaware	81.8	77.4	18.2	22.6	.....	.....
District of Columbia	100.0	100.0	.....	.....	.....	.....
Florida	43.2	92.2	56.6	7.8	.2	neg
Georgia	91.2	98.6	8.3	1.3	.5	.1
Hawaii	50.7	89.8	47.9	9.3	1.4	.9
Idaho	74.5	75.1	24.5	24.6	1.0	.3
Illinois	82.4	89.6	17.5	10.4	.1	neg
Indiana	84.9	59.2	14.8	40.7	.3	.1
Iowa	97.7	90.6	2.3	9.4	.....	.....
Kansas	95.6	94.9	4.4	5.1	.....	.....
Kentucky	60.7	82.9	36.3	15.4	3.0	1.7
Louisiana	62.7	79.7	36.5	20.1	.8	.2
Maine	45.0	71.8	54.4	28.1	.6	.1
Maryland	57.0	97.4	41.1	2.4	1.9	.2
Massachusetts	84.3	96.6	15.7	3.4	.....	.....
Michigan	72.9	97.5	27.1	2.5	.....	.....
Minnesota	96.4	99.0	3.6	1.0	.....	.....
Mississippi	88.3	96.0	9.9	3.7	1.8	.3
Missouri	89.0	71.5	10.8	28.4	.2	.1
Montana	79.5	72.9	19.9	27.0	.6	.1
Nebraska	99.8	99.9	.2	.1	.....	.....
Nevada	54.5	57.9	45.5	42.1	.....	.....
New Hampshire	73.8	78.3	25.4	18.5	.8	3.2
New Jersey	45.0	40.0	54.1	59.8	.9	.2
New Mexico	80.1	83.5	19.4	16.5	.5	neg
New York	71.9	89.0	27.0	10.6	1.1	.4
North Carolina	77.7	93.0	22.0	6.7	.3	.3
North Dakota	99.3	97.7	.7	2.3	.....	.....
Ohio	92.6	96.4	7.2	3.6	.2	neg
Oklahoma	87.5	98.0	12.5	2.0	.....	.....
Oregon	71.9	90.9	28.1	9.1	.....	.....
Pennsylvania	48.5	68.1	50.3	31.3	1.2	.6
Rhode Island	44.7	92.1	55.3	7.9	.....	.....
South Carolina	74.6	93.9	25.4	6.1	.....	.....
South Dakota	95.9	95.8	4.1	4.2	.....	.....
Tennessee	79.4	82.8	20.6	17.2	.....	.....
Texas	70.4	96.0	29.1	3.9	.5	.1
Utah	66.6	90.5	32.5	8.8	.9	.7
Vermont	54.8	90.7	45.2	9.3	.....	.....
Virginia	41.6	85.3	58.0	14.6	.4	.1
Washington	72.8	94.8	24.8	4.5	2.4	.7
West Virginia	24.6	45.5	74.9	54.1	.5	.4
Wisconsin	93.0	95.5	5.5	3.6	1.5	.9
Wyoming	75.3	79.0	18.3	11.5	6.4	9.5
Puerto Rico	100.0	100.0	.....	.....	.....	.....
Virgin Islands	100.0	100.0	.....	.....	.....	.....

Table 17. *Percent of known ownership of facilities and population—served by publicly owned, privately owned and both publicly and privately owned water supplies arranged by population groups, States, and drainage basins*—Continued

Population groups	Public		Private		Both public and private	
	Facilities	Population served	Facilities	Population served	Facilities	Population served
MAJOR DRAINAGE BASINS						
Northeast	64.1	85.0	35.2	14.6	.7	.4
North Atlantic	50.0	74.7	48.9	25.0	1.1	.3
Southeast	69.6	93.4	30.0	6.5	.4	.1
Tennessee River	72.2	74.7	27.8	25.3	.....	.....
Ohio River	61.6	73.2	37.7	26.3	.7	.5
Lake Erie	91.7	97.4	8.3	2.6	.....	.....
Upper Mississippi	91.1	88.5	8.7	11.5	.2	neg
Western Great Lakes	76.7	95.1	22.9	4.6	.4	.3
Missouri River	95.2	91.0	4.5	8.6	.3	.4
Southwest—Lower Mississippi	82.9	89.1	16.2	10.3	.9	.6
Colorado River	58.0	80.8	40.8	18.6	1.2	.6
Western Gulf	70.4	95.0	29.1	4.9	.5	.1
Pacific Northwest	71.9	90.5	26.7	9.0	1.4	.5
California	56.6	78.8	43.3	21.2	.1	neg
Great Basin	61.3	77.4	38.0	22.1	.7	.5
Alaska	71.1	84.3	28.9	15.7	.....	.....
Hawaii	50.7	89.9	47.9	9.3	1.4	.8
Puerto Rico	100.0	100.0	.....	.....	.....	.....
Virgin Islands	100.0	100.0	.....	.....	.....	.....
Total	72.2	84.3	27.2	15.5	.6	.2

Table 18. *Growth in number of waterworks in the United States*

Year	*Number of works*
1800 [1]	16
1810	26
1820	30
1830	44
1840	64
1850	83
1860	136
1870	243
1880	598
1890	1,878
1896	3,196
1924	9,850
1934 [2]	10,790
1939 [3]	12,760
1948	16,747
1958 [4]	20,459

[1] Data for 1800 to 1924 inclusive, from *Manual of Waterworks Practice* (7).

[2] From *Water Supply Practice* (8).

[3] From *Engineering News-Record* (6).

[4] 1958 data are number of communities and represent distribution systems. Hence the figures are not strictly comparable to earlier data. These communities were served by 17,808 producing facilities.

Missouri River and Lake Erie Basins with 95.2 percent and 91.7 percent respectively have the largest percentages of publicly owned supplies.

Comparison with Older Data

Some attempts have been made to compare general data or source and treatment from this study with previously reported information (*2*). These older data were prepared on two distinct bases: number of communities, and number of treatment plants—the population served being included in both cases. This new analysis, as previously stated, is based upon the facility concept rather than the community concept. And for this reason, in many instances, direct comparisons of data cannot be made.

Table 18, modified from Water Supply Practice (*8*), and brought up to date to include number of water works in 1948 and 1958, is presented to show the growth of works in the United States.

As shown by table 18, the 10-year period from 1948 to 1958 has been the greatest in the development of water treatment plants in the United States. As could be expected however, development of new systems was largely among the smaller communities.

Treatment Facilities

General

In 1958 there were 9,911 individual water treatment plants serving in excess of 121,508,000 persons. As mentioned earlier, "treatment" means performing any process on water, even aeration alone. The majority of these plants, 54.1 percent, were simple disinfection plants. On a functional basis the next largest number of plants was the class listed as rapid sand purification. This class comprised 21.6 percent of the total number of plants of all types. Population wise, simple disinfection plants served 38.9 percent, and rapid sand purification plants 41.0 percent, of the total served by all treatment plants.

The percentages of total plants and population served for all functional classes of treatment plants are in table 2.

States

The largest number of water treatment facilities, 702, was reported by Pennsylvania while New York reported the greatest population served, more than 13,558,000. No attempt has been made on a State basis to analyze the percentages of facilities in each functional category, since these percentages vary greatly from State to State. Except Alaska, all States and the District of Columbia have rapid sand purification plants, while 31 States and the District of Columbia also have slow sand filtration plants. All States have simple disinfection plants and nearly all States have treatment plants incorporating softening.

Table 19. *Percent of total plants and population served for each type* of treatment—within population groups*

NUMBER OF PLANTS—PERCENT

Type plant	Less than 500	500–1,000	1,000–5,000	5,000–10,000	10,000–25,000	25,000–50,000	50,000–100,000	More than 100,000	Total
Purification	8.0	13.3	23.7	34.3	34.6	36.8	42.7	46.9	21.6
Purification and softening	.4	1.4	2.2	4.6	8.3	6.8	5.3	12.4	2.7
Purification and iron and manganese removal	.1	.7	.5	.9	1.7	1.8	.7	.5	.7
Purification, softening and iron and manganese removal	.....	.2	.4	.5	.1	1.8	.7	2.6	.4
Softening	2.0	4.2	4.1	2.9	4.2	3.6	2.0	2.1	3.6
Iron and manganese removal	11.6	12.2	8.7	6.2	4.6	6.8	.7	3.6	9.2
Softening iron and manganese removal	1.7	3.7	4.0	4.2	2.5	3.2	1.3	1.0	3.3
Disinfection—alone or with miscellaneous processes	72.7	60.5	50.6	42.1	40.2	37.1	44.6	30.4	54.1
Miscellaneous	3.5	3.8	5.8	4.3	3.8	2.1	2.0	.5	4.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

ESTIMATED POPULATION SERVED—PERCENT

Purification	14.9	14.9	26.9	36.8	37.1	40.5	47.9	44.6	41.0
Purification and softening	.7	1.7	2.2	4.7	7.8	7.5	5.9	12.7	9.4
Purification and iron and manganese removal	.1	.6	.6	1.4	2.0	1.4	.5	.2	.6
Purification, softening and iron and manganese removal	.....	.2	.4	.5	.2	2.4	1.3	1.6	1.3
Softening	2.1	4.2	3.6	2.6	4.4	3.7	2.4	1.2	2.3
Iron and manganese removal	10.6	10.4	7.7	5.8	3.7	6.2	1.1	1.7	3.2
Softening iron and manganese removal	2.0	3.4	3.9	4.2	2.9	3.8	1.6	.8	1.9
Disinfection—alone or with miscellaneous processes	66.6	61.0	49.4	40.1	38.9	33.3	38.3	37.1	38.9
Miscellaneous	3.0	3.6	5.3	3.9	3.0	1.2	1.0	.1	1.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

*Based on primary function or functions.

Population Groups

Treatment plants or facilities based on the size of community or communities they serve show definite patterns of practice. Table 19 shows a percentage analysis, both for the number of plants and estimated population served, of the functional classes of plants. The percentage of plants classed as purification increases directly with the size of the community, while, with the exception of the 50,000–100,000 population group, simple disinfection plants decrease in percentage as the size of the community increases. Percentages of population served for these two classes show the same general trends as do those for number of plants. The highest percentage for purification plants is in the population group over 100,000 where 46.9 percent of the plants serve 44.6 percent of the total population connected to all plants in this group. In the group under 500 population, simple disinfection plants comprise 72.7 percent of the total plants and serve 66.6 percent of the population. Softening techniques are used in facilities serving communities from 500 to 50,000 population, while iron removal plants are quite common in facilities serving less than 5,000 population. Plants classed as both softening and iron removal generally

follow the same pattern as is shown by softening plants above. Generally, percentage data for populations served follow those for number of plants.

Major Drainage Basins

Percentage data for the various functional classes of treatment plants are analyzed by major drainage basins in table 20. Considering the number of plants, Puerto Rico with 53.2 percent and the Tennessee River Basin with 34.9 percent, have the highest percentage of purification plants. These basins also have the highest percentage of population served by this type of plant. The Ohio River, Lake Erie, and the Upper Mississippi drainage basins have the highest percentage of softening plants and combined treatment including softening. These basins also have the highest percentages of iron and manganese removal plants. As expected, the dominant type of treatment in all basins are disinfection alone or disinfection with miscellaneous processes. In 10 of the major drainage basins, these types of plants also serve the highest percentage of the people.

Comparison With Prior Data

Table 21 shows the number of purification plants of all types for the years 1924 to 1958. Between 1924 and 1930 these data show an increase of 893 plants as compared with increases of 324, 199, and 463 in the next 10, 8, and 10 years respectively.

Table 22 shows data on the populations served since 1870 by both slow and rapid sand filtration. All data are comparable with the exception of that of 1924 where this tabulation included plants of 1.0 million gallons daily or more capacity. Population served by rapid sand filter type plants has increased 39.9 percent since 1948.

Table 20. *Percent of total plants and population served for each type* of treatment—within drainage basins*

NUMBER OF PLANTS—PERCENT

Type plant	(1) Northeast	(2) North Atlantic	(3) Southeast	(4) Tennessee River	(5) Ohio River	(6) Lake Erie	(7) Upper Mississippi	(8) Western Great Lakes	(9) Missouri River	(10) Southwest Lower Mississippi	(11) Colorado River	(12) Western Gulf	(13) Pacific Northwest	(14) California	(15) Great Basin	(16) Alaska	(17) Hawaii	(18) Puerto Rico	(19) Virgin Islands
Purification	20.3	18.4	31.2	31.9	29.4	20.2	14.3	23.8	21.7	21.3	17.4	20.2	10.5	12.4	7.8	11.1	26.1	53.2	.....
Purification and softening	.5	.9	.9	.4	4.7	19.6	2.8	4.0	3.8	5.3	.6	2.0	.....	.5	1.7	.....	.....	.....	.....
Purification and iron and manganese removal	.6	.7	.5	.4	1.2	.....	.2	.....	.3	1.6	.6	1.0	.3	.3	.....	.....	.....	.....	.....
Purification, softening and iron and manganese removal	.1	.2	.5	.....	.5	.....	.6	.....	.4	.6	.....	.7	.....	.....	.....	.....	.....	.....	.....
Softening	1.1	1.6	2.4	.4	7.7	15.2	6.5	5.6	4.6	1.5	3.2	1.0	.3	1.3	.....	.....	.....	.....	.....
Iron and manganese removal	1.8	7.4	7.8	4.4	10.6	8.9	26.0	9.6	11.9	10.4	.6	1.3	.5	1.6	.....	.....	.....	.....	.....
Softening iron and manganese removal	.4	.5	3.4	.....	4.3	8.9	11.6	4.6	2.2	3.9	.....	.....	.3	.....	.....	.....	.....	.....	.....
Disinfection—alone or with miscellaneous processes	68.0	68.4	46.2	59.1	40.2	22.8	30.4	39.8	54.2	53.2	76.3	72.1	85.1	76.5	88.8	88.9	73.9	46.8	.....
Miscellaneous	7.2	1.9	7.1	.4	1.4	4.4	10.6	12.6	.9	2.2	1.3	1.7	3.0	7.4	1.7	.....	.....	.....	.....
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.....

ESTIMATED POPULATION SERVED—PERCENT

Purification	38.2	41.5	53.7	69.0	47.7	65.2	28.1	65.6	44.8	29.6	41.7	36.9	12.0	24.8	11.4	5.6	1.4	78.2	.....
Purification and softening	.2	.4	3.2	.2	19.5	28.0	22.6	8.0	24.2	20.6	Neg.	6.8	.....	8.5	3.3	.....	.....	.....	.....
Purification and iron and manganese removal	.6	.5	1.8	.1	1.7	.....	.2	.....	Neg.	.6	.4	.5	.2	.4	.....	.....	.....	.....	.....
Purification, softening and iron and manganese removal	Neg.	.1	.7	.....	1.5	.....	1.9	.....	2.4	.5	.....	12.3	.....	.....	.....	.....	.....	.....	.....
Softening	.3	.4	4.0	Neg.	7.3	2.0	3.5	1.4	1.6	5.6	1.3	.7	.1	1.2	.....	.....	.....	.....	.....
Iron and manganese removal	.9	3.8	2.4	1.5	4.4	.3	5.9	2.4	5.5	12.1	1.4	.1	.2	.2	.....	.....	.....	.....	.....
Softening iron and manganese removal	.1	.1	9.3	.....	1.9	2.4	3.3	3.3	2.2	3.4	.....	.....	Neg.	.....	.....	.....	.....	.....	.....
Disinfection—alone or with miscellaneous processes	57.2	52.0	22.1	29.1	15.8	1.9	32.1	17.6	18.4	27.1	54.1	42.5	86.5	63.7	85.1	94.4	98.6	21.8	.....
Miscellaneous	2.5	1.2	2.8	.1	.2	.2	3.3	1.7	.9	.5	1.1	.2	1.0	1.2	.2	.....	.....	.....	.....
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.....

*Based on primary function or functions.

Table 21. *Number of purification plants of all types in 1924, 1930, 1940, 1948, and 1958*

NUMBER OF PURIFICATION PLANTS ALL TYPES

States	1924[1]	1930[2]	1940[2]	1948	1958
Alabama	13	48	65	72	79
Alaska					2
Arizona	0	2	3	7	7
Arkansas	11	28	30	36	47
California	9	19	38	40	56
Colorado	6	15	25	31	39
Connecticut	5	15	26	27	23
Delaware	2	1	3	3	2
District of Columbia	1	2	2	2	2
Florida	3	23	15	21	18
Georgia	13	50	74	79	89
Hawaii					6
Idaho	1	4	3	6	5
Illinois	33	77	104	113	121
Indiana	19	31	41	46	47
Iowa	12	24	33	35	34
Kansas	14	50	57	60	73
Kentucky	14	45	99	110	150
Louisiana	5	11	22	29	46
Maine	9	15	18	20	21
Maryland	10	13	16	16	17
Massachusetts	8	19	26	27	22
Michigan	18	28	42	43	51
Minnesota	9	19	18	19	26
Mississippi	4	9	4	4	6
Missouri	14	58	75	73	125
Montana	5	11	10	10	13
Nebraska	1	8	7	7	8
Nevada	0	0	3	6	2
New Hampshire	2	12	10	10	3
New Jersey	19	47	33	37	33
New Mexico	0	5	3	4	13
New York	39	96	126	136	130
North Carolina	43	86	96	106	118
North Dakota	5	6	11	13	21
Ohio	46	98	86	97	134
Oklahoma	25	56	68	73	96
Oregon	4	17	15	18	20
Pennsylvania	86	196	193	180	194
Rhode Island	5	8	8	9	9
South Carolina	16	29	40	58	67
South Dakota	3	8	8	11	14
Tennessee	13	36	37	48	79
Texas	23	47	73	94	160
Utah	0	2	3	2	12
Vermont	2	2	3	4	5
Virginia	26	72	59	71	85
Washington	7	9	8	14	17
West Virginia	22	51	91	99	108
Wisconsin	9	18	17	19	21
Wyoming	4	5	8	9	8
Puerto Rico					33
Total	638	1,531	1,855	2,054	2,517

[1] Data from Gillespie (6).
[2] Data from Streeter (5). These figures have been summarized from the basic data accompanying the summary report.
[3] Data from Weibel (3). These data include plants enumerated in the footnotes, but not shown in the tables.

Table 22. *Total population served by slow and rapid sand type purification plants—1870 to 1958*

Year	Slow sand purification plants	Rapid sand purification plants
1870 [1]	None	None
1880	30,000	None
1890	35,000	275,000
1900	360,000	1,500,000
1904	560,000	2,600,000
1910	3,883,000	6,922,000
1914	5,398,000	11,893,000
1924 [2]	5,054,000	18,610,000
1948	2,014,635	39,731,460
1958 [3]	3,177,380	55,606,245

[1] Data for 1870 to 1914 inclusive from Alvord, John W. *Recent progress and tendencies in municipal water supply practice in the United States.* J.A.W.W.A., 4:278-299 (1917).
[2] From: Gillespie, C. G. *Census of water filtration plants 1924.* J.A.W.W.A. 14:123-142 (Aug. 1925). This tabulation lists plants of 1.0 MGD capacity or larger.
[3] Population served is for slow sand and rapid sand purification plants only. The population shown does not include population served by plants utilizing slow and rapid sand filters in combination within a single plant.

Unit Facilities

General

Tables 12 and 13 summarize data on the various unit facilities found in American waterworks. These data represent those unit processes which occur frequently in practice and for this reason have been so selected. Even so, the data are not shown in detail, but in general terms for the purpose of this summary.

Disinfection

In 1958 there were 8,845 water treatment plants serving more than 117,323,000 persons with water which was disinfected at some stage of the treatment process. This is an increase of over 45 percent over the 1948 reported data. The process of disinfection is used in 89.0 percent of all treatment plants, and serves 96.5 percent of the population receiving treated water. In fact, 88.1 percent of the total population served by public water facilities receives water that has been disinfected, showing the important place this unit process continues to occupy in water treatment practices.

The figures given above show that disinfection is the largest unit process in use in the U.S. water facilities. The term disinfection usually means chlorination. In only 46 plants is the use of other disinfecting agents definitely reported. There were 91 plants for which the actual disinfecting agents were not reported, but it can be reasonably assumed that most of these plants use chlorine.

Liquid chlorine alone is used at 5,118 facilities serving more than 78 million persons. Chloramine treatment by 404 water treatment facilities serves 28,080,000 persons, and hypochlorites are used at 3,029 plants that serve over 4,282,000 persons.

In 23 States more than 90 percent of the total population served by water facilities is served disinfected water. Maryland with 99.3 percent of the population being served disinfected water has the highest State percentage, while Nevada with 52.4 percent, so served, has the lowest. In the District of Columbia and Puerto Rico all treated water is disinfected, while in the Virgin Islands none of it was disinfected. Data showing the percent of the population served by water supplies receiving disinfected water by population groups is shown in table 23.

Table 23. *Percent of population served by water supplies receiving disinfected water—by population groups*

	Percent of total population receiving disinfected water
Less than 500	36.1
500–1,000	50.7
1,000–5,000	63.9
5,000–10,000	79.8
10,000–25,000	82.3
25,000–50,000	91.0
50,000–100,000	96.5
More than 100,000	97.6
Total	88.1

The national average of the population which is served by disinfected water is 88.1 percent, and is exceeded only by the three largest population size groups. These larger-population groups, of course, greatly affect the national average. While there has been a great improvement made in the last 10 years in the lower three population size groups, the problem remains of extending disinfection service to the smaller communities of 5,000 population and less.

By referring to table 12, differences in practice among the States can be noted. The use of liquid chlorine is predominant, and in only 10 States does chloramine disinfection serve the largest population. Percentage data for various types of disinfection within each population group are given in table 24 and by major drainage basins in table 25. Referring to table 24, the use of hypochlorites is most common in facilities serving less than 500 population and drops off steadily, reaching a minimum of 2.9 percent in group 25,000–50,000 then rising slightly in the group between 50,000–100,000. From the standpoint of percentage of number of facilities, the use of liquid chlorine increases sharply from the lowest group up to 10,000 population then declines slowly through the larger population groups. Chloramine treatment, used in only 0.1 percent of the facilities serving less than 500 population, increases steadily throughout the population groups, reaching a maximum of 28.7 percent in the highest population group of 100,000 population and over.

The percentage data for population served in table 25 are quite indicative of variations in practice among the various basins. Chlorine is the

disinfecting agent for the highest percentage of population served in the Tennessee River Basin. Chloramine treatment predominates in the Pacific Northwest Basin. This basin also has the smallest percentage of persons served by liquid chlorine as the sole disinfection agent. The Colorado River Basin, with 16.2 percent, has the largest percentage of population served by hypochlorites.

Comparisons With 1948 and 1958

In table 26 the number of plants providing disinfection is given for the years 1940, 1948, and 1958. Various methods of disinfection are given for the years of 1948 and 1958. Changes occurring between 1948 and 1958 are analyzed in table 27 for various disinfection methods for all States. From 1940 to 1948, the number of plants providing disinfection was increased by 1487, a change of almost 32 percent. Between 1948 and 1958, an additional 2646 plants using disinfection were reported, resulting in a 43 percent change. Thus between 1940 and 1958 the number of plants providing disinfection increased 88.9 percent. This shows a tremendous growth for the period, and it is certain that no other unit process has increased as this one.

For the period 1948–58 plants using liquid chlorine as the disinfecting agent increased by about 40 percent, and the number utilizing hypochlorites increased over 93 percent. Plants using chloramine disinfection decreased by 298 or 42 percent in the 1948–58 period. Almost all of the States showed a decline in the number of plants using this treatment.

Table 24. *Percent of plants and population served by various types of disinfecting agents—within population groups*

(Population Groups)

Type disinfecting agent	Less than 500	500–1,000	1,000–5,000	5,000–10,000	10,000–25,000	25,000–50,000	50,000–100,000	More than 100,000	Total
	Number of plants—Percent								
Ammonia—chlorine	0.1	0.5	3.0	8.1	12.8	18.4	23.5	28.7	4.6
Liquid chlorine	29.1	41.0	67.7	81.4	79.5	75.4	66.5	62.2	57.9
Hypochlorite	68.8	55.5	25.4	7.2	4.6	2.9	4.7	3.2	34.2
Both liquid chlorine and hypochlorite	.7	1.3	2.5	2.3	1.1	1.8	1.3	2.1	1.8
Ozone	.1	.....	neg	.....	.....	.....	.....	.....	neg
Others	.5	.5	.3	.5	.8	.....	2.0	2.7	.5
Unspecified	.7	1.2	1.1	.5	1.2	1.5	2.0	1.1	1.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Estimated population served—Percent								
Ammonia—chlorine	0.1	0.7	4.0	9.4	13.5	20.9	29.6	31.1	23.9
Liquid chlorine	40.5	49.2	73.2	81.9	80.0	74.1	63.6	61.4	66.8
Hypochlorite	57.8	46.9	18.4	5.1	2.8	1.3	2.4	.3	3.6
Both liquid chlorine and hypochlorite	.4	1.1	2.8	2.3	1.1	2.1	.7	4.6	3.2
Ozone	.1	.....	neg	.....	.....	.....	.....	.....	neg
Others	.3	.6	.3	.7	.9	.....	2.6	2.3	1.7
Unspecified	.8	1.5	1.3	.6	1.7	1.6	1.1	.3	.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 25. *Percent of plants and population served by various types of disinfecting agents—within drainage basins*

Type disinfecting plant	MAJOR DRAINAGE BASINS																			
	(1) Northeast	(2) North Atlantic	(3) Southeast	(4) Tennessee River	(5) Ohio River	(6) Lake Erie	(7) Upper Mississippi	(8) Western Great Lakes	(9) Missouri River	(10) Southwest Lower Mississippi	(11) Colorado River	(12) Western Gulf	(13) Pacific Northwest	(14) California	(15) Great Basin	(16) Alaska	(17) Hawaii	(18) Puerto Rico	(19) Virgin Islands	Total
	Number of plants—percent																			
Ammonia—chlorine	6.9	6.1	4.5	.8	4.0	7.1	4.3	8.9	5.8	3.0	2.6	1.5	7.2	1.7	8.8					4.6
Liquid chlorine	53.2	49.9	58.5	67.7	64.7	62.7	53.0	63.3	42.7	58.3	50.7	69.2	52.8	75.5	63.7	52.9	45.5	75.8		57.9
Hypochlorite	36.1	35.7	35.6	27.9	28.7	27.0	40.8	25.8	48.9	36.8	46.7	27.9	38.4	14.7	13.3	47.1	45.5	19.4		31.2
Both liquid chlorine and hypochlorite	1.6	4.3	1.0	2.4	1.6	1.6	1.2	.8	2.2	1.2		.9	1.0	2.6	2.7		9.0	3.2		1.8
Ozone	.4	1.3	.4	.4	.4	1.6	.2	.4					.3	1.5						neg
Other	1.8	2.7		.8	.6		.5	.8	.3	.2		.2	.3	4.0	11.5			1.6		.5
Unspecified									.1	.5		.3								.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		100.0
	Estimated population served—percent																			
Ammonia—chlorine	27.3	18.3	25.2	2.8	23.7	31.7	42.9	30.4	30.5	24.7	8.8	11.6	54.3	3.3	28.7					23.9
Liquid chlorine	63.4	70.5	70.7	92.3	71.7	62.3	51.0	65.5	62.3	69.4	75.0	81.5	41.5	63.6	60.5	89.5	48.0	91.5		66.8
Hypochlorite	5.4	3.0	3.5	3.3	3.1	1.0	2.6	3.6	6.6	5.0	16.2	2.9	3.9	3.1	3.9	10.5	3.2	6.7		3.6
Both liquid chlorine and hypochlorite	2.9	1.5	.5	1.0	.7	.1	.8	.3	.5	.4		.6	.3	27.3	1.2		48.8	1.1		3.2
Ozone								neg				neg	neg	.7						neg
Other	.1	5.1	.1	.1	.3	4.9	2.5	.2	.1	.2		neg		2.0	5.7			.7		1.7
Unspecified	.9	1.6		.5	.5		.2		neg	.3		.4								.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		100.0

Table 26. *Comparison of number of plants in 1940, 1948, and 1958, having disinfection, and by various methods in 1948 and 1958 by States*

State	Total			Liquid chlorine		Hypochlorite		Ammonia chorine		Liquid chlorine and hypochlorite		Ozone		Other		Unspecified	
	1940	1948	1958	1948	1958	1948	1958	1948	1958	1948	1958	1948	1958	1948	1958	1948	1958
Alabama	162	187	230	87	90	99	138	1	1	.....	1	.....	.....	.....	.....	.....	.....
Alaska	.....	.....	17	.....	9	.....	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Arizona	23	44	54	20	25	19	27	4	2	.....	.....	.....	.....	.....	.....	.....	.....
Arkansas	59	80	142	60	101	14	36	5	3	.....	1	.....	.....	.....	.....	1	.....
California	120	150	381	41	287	6	54	25	8	.....	10	.....	.....	.....	.....	1	1
Colorado	34	56	148	44	82	9	54	.....	11	.....	.....	.....	.....	.....	5	78	17
Connecticut	73	88	94	56	54	26	30	6	3	.....	2	.....	.....	.....	.....	3	1
Delaware	3	6	22	6	19	.....	2	.....	1	.....	.....	.....	.....	.....	.....	.....	5
District of Columbia	2	2	2	.....	2	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
Florida	46	130	304	75	171	25	117	22	10	.....	6	.....	.....	.....	.....	8	.....
Georgia	155	189	183	127	132	42	39	19	10	.....	.....	.....	.....	.....	2	1	.....
Hawaii*	.....	.....	22	.....	10	.....	10	.....	.....	.....	2	.....	.....	.....	.....	.....	.....
Idaho	19	52	63	29	41	18	19	5	2	.....	1	.....	.....	.....	.....	.....	.....
Illinois	193	252	461	174	273	39	165	37	14	.....	7	.....	.....	.....	.....	2	2
Indiana	183	248	305	164	216	61	73	21	10	.....	5	.....	.....	.....	1	2	.....
Iowa	111	183	273	90	102	78	159	8	5	.....	3	.....	.....	.....	.....	7	4
Kansas	84	181	385	78	117	75	237	24	13	1	17	.....	.....	.....	1	3	.....
Kentucky	170	182	223	121	154	24	43	23	19	.....	3	.....	.....	.....	2	14	2
Louisiana	36	79	145	50	107	22	29	7	9	.....	.....	.....	.....	.....	.....	.....	.....
Maine	96	101	111	47	46	32	42	21	19	1	3	.....	.....	.....	1	.....	.....
Maryland	42	63	91	24	37	30	45	5	4	3	4	.....	.....	.....	1	1	.....
Massachusetts	70	90	97	57	73	13	23	16	1	.....	.....	.....	.....	.....	.....	4	.....
Michigan	92	121	153	75	103	28	44	16	3	.....	1	.....	1	.....	1	2	.....
Minnesota	42	71	109	37	55	14	41	20	13	.....	.....	.....	.....	.....	.....	.....	.....
Mississippi	25	54	69	26	43	21	25	4	1	.....	.....	.....	.....	.....	.....	3	.....
Missouri	107	129	180	104	96	7	73	16	7	.....	2	.....	.....	.....	2	2	.....
Montana	46	48	91	24	43	9	31	14	16	.....	1	.....	.....	.....	.....	1	.....
Nebraska	19	16	19	7	9	2	9	3	1	.....	.....	.....	.....	.....	.....	4	.....
Nevada	8	11	18	6	9	2	3	2	1	.....	.....	.....	.....	.....	.....	1	5
New Hampshire	33	39	55	18	17	21	37	.....	.....	.....	1	.....	.....	.....	.....	.....	.....

New Jersey	143	193	221	72	96	52	70	36	22	5	10	.....	.....	.....	1	28	22
New Mexico	14	35	79	21	44	14	30	.....	.....	.....	3	.....	.....	.....	1	.....	1
New York	407	453	454	228	262	109	133	85	41	4	7	.....	.....	1	2	26	9
North Carolina	147	173	220	116	149	26	54	31	13	.....	3	.....	.....	.....	1	.....	.....
North Dakota	14	16	27	9	12	.....	7	7	6	.....	1	.....	.....	.....	.....	.....	.....
Ohio	142	211	300	131	169	56	109	22	18	1	4	.....	.....	.....	.....	1	.....
Oklahoma	103	129	240	88	126	25	101	16	7	.....	2	.....	.....	.....	1	.....	3
Oregon	85	138	165	68	80	50	74	19	10	1	.....	.....	1	.....	.....	.....	.....
Pennsylvania	596	638	691	372	368	185	240	49	31	12	31	.....	.....	.....	15	20	6
Rhode Island	17	25	30	7	9	15	21	3	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Carolina	49	81	85	66	64	5	8	9	12	.....	.....	.....	.....	.....	1	1	.....
South Dakota	29	52	87	32	41	12	39	8	6	.....	1	.....	.....	.....	.....	.....	.....
Tennessee	117	141	219	103	162	25	49	12	1	.....	4	.....	.....	1	1	.....	2
Texas	191	318	578	243	408	61	156	12	10	.....	3	.....	.....	.....	.....	2	1
Utah	22	20	92	13	52	.....	27	6	6	.....	2	.....	.....	.....	.....	1	5
Vermont	6	23	55	15	22	8	33	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Virginia	152	190	221	103	122	73	89	11	3	2	6	.....	.....	.....	1	1	.....
Washington	89	121	139	61	74	39	49	19	13	2	2	.....	.....	.....	1	4	4
West Virginia	202	234	283	162	195	51	72	14	8	3	3	.....	.....	.....	1	.....	.....
Wisconsin	59	68	103	40	58	13	32	13	9	2	3	.....	.....	.....	.....	.....	.....
Wyoming	13	26	47	16	35	2	11	4	1	.....	.....	.....	.....	.....	.....	4	.....
State Total	4,650	6,137	8,783	3,613	5,071	1,557	3,017	702	404	37	155	.....	2	2	44	226	90
Puerto Rico*	.....	.....	62	.....	47	.....	12	.....	.....	.....	2	.....	.....	.....	.....	.....	1
Virgin Islands*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total all	.....	.....	8,845	.....	5,118	.....	3,029	.....	404	37	157	.....	2	2	44	226	91

*Figures not reported in 1940 and 1948.

Table 27. *Change in number of plants and percent increase or decrease between 1948 and 1958 for various disinfection methods*

States	Total		Liquid chlorine		Hypochlorite		Ammonia chlorine	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Alabama	43	23.0	3	3.4	39	39.4	.....	0
Alaska	*17	.....	*9	.....	*8	.....	.....	.....
Arizona	10	22.7	5	25.0	8	42.1	−2	−50.0
Arkansas	62	77.5	41	68.3	22	157.1	−2	−40.0
California	231	154.0	246	600.0	48	800.0	−17	−68.0
Colorado	92	164.3	38	86.4	45	500.0	11	.....
Connecticut	6	6.8	−2	−3.6	4	15.4	−3	−50.0
Delaware	16	266.7	13	216.7	2	.....	1	.....
District of Columbia	0	0	2	.....	.....	.....	−2	−100.0
Florida	174	133.8	96	128.0	92	368.0	−12	−54.5
Georgia	−6	−3.2	5	3.9	−3	−7.1	−9	−47.4
Hawaii	*22	.....	*10	.....	*10	.....	.....	.....
Idaho	11	21.2	12	41.4	1	5.6	−3	−60.0
Illinois	209	82.9	99	56.9	126	323.1	−23	−62.2
Indiana	57	23.0	52	31.7	12	19.7	−11	−52.4
Iowa	90	49.2	22	24.4	81	103.8	−3	−37.5
Kansas	204	112.7	39	50.0	162	216.0	−11	−45.8
Kentucky	41	22.5	33	27.3	19	79.2	−4	−17.4
Louisiana	66	83.5	57	114.0	7	31.8	2	28.6
Maine	10	9.9	−1	−2.1	10	31.3	−2	−9.5
Maryland	28	44.4	13	54.2	15	50.0	−1	−20.0
Massachusetts	7	7.8	16	28.1	10	76.9	−15	−93.8
Michigan	32	26.4	28	37.3	16	57.1	−13	−81.3
Minnesota	38	53.5	18	48.6	27	192.9	−7	−35.0
Mississippi	15	27.8	17	65.4	4	19.0	−3	−75.0
Missouri	51	39.5	−8	−7.7	66	942.9	−9	−56.3
Montana	43	89.6	19	79.2	22	244.4	2	14.3
Nebraska	3	18.8	2	28.6	7	350.0	−7	−87.5
Nevada	7	63.6	3	50.0	1	50.0	−1	−50.0
New Hampshire	16	41.0	−1	−5.6	16	76.2	.....	.....
New Jersey	28	14.5	24	33.3	18	34.6	−14	−38.9
New Mexico	44	125.7	23	109.5	16	114.3	.....	.....
New York	1	.2	34	14.9	24	22.0	−44	−51.8
North Carolina	47	27.2	33	28.4	28	107.7	−18	−58.1
North Dakota	11	68.8	3	33.3	7	.....	−1	−14.3
Ohio	89	42.2	38	29.0	53	94.6	−4	−18.2
Oklahoma	111	86.0	38	43.2	76	304.0	−9	−56.3
Oregon	27	19.6	12	17.6	24	48.0	−9	−47.4
Pennsylvania	53	8.3	−4	−1.1	55	29.7	−18	−36.7
Rhode Island	5	20.0	2	28.6	6	40.0	−3	−100.0
South Carolina	4	4.9	−2	−3.0	3	60.0	3	33.3
South Dakota	35	67.3	9	28.1	27	225.0	−2	−25.0
Tennessee	78	55.3	59	57.3	24	96.0	−11	−91.7
Texas	260	81.8	165	67.9	95	135.7	−2	−16.7
Utah	72	360.0	39	300.0	27	.....	.....	0
Vermont	32	139.1	7	46.7	25	312.5	.....	.....
Virginia	31	16.3	19	18.4	16	21.9	−8	−72.7
Washington	18	14.9	13	21.3	10	25.6	−6	−31.6
West Virginia	49	20.9	33	20.4	21	41.2	−6	−42.9
Wisconsin	35	51.5	18	45.0	19	146.2	−4	−30.8
Wyoming	21	80.8	19	118.8	9	450.0	−3	−75.0
Total States	2,646	43.1	1,468	40.4	1,460	93.8	−303	−57.1
Puerto Rico	*62	.....	*47	.....	*12	.....	.....	.....
Virgin Islands	.....	.....	.....	.....	.....	.....	.....	.....
Total all	2,708	.....	1,515	.....	1,472	.....	−303	.....

*Not shown in 1948.

Filtration

Gravity rapid sand filtration is reported in use at 2,387 plants serving more than 58 million persons (table 13). Ohio has the largest number, 215 plants, and also the greatest population served by this type of filter (5,939,000). The Ohio River Basin has the greatest number, 567, of rapid gravity sand filter treatment plants among the major drainage basins. Rapid sand filters are used in over 24 percent of all treatment plants serving 48.4 percent of the total population receiving treated water. As of the 1958 Inventory, Alaska was the only State from which no installation of this type was reported. Since then, however, both Anchorage and Fairbanks have placed filters in operation. Table 28 shows the percentage by population groups of gravity rapid sand filters. This type of filter is not used to any great extent in the lower population groups, but increases with population to a maximum of 55.2 percent in places of over 100,000 population.

Table 28. *Percentage of all treatment plants having various unit process—arranged by population groups and major basins*

Population groups	Proportion of all treatment plants having—			
	Gravity rapid-sand filter	Aeration	Taste and odor control	Corrosion control
Less than 500	7.7	17.9	1.2	10.7
500–1,000	15.7	22.5	4.1	15.5
1,000–5,000	25.8	23.2	10.1	22.3
5,000–10,000	36.9	23.3	21.2	29.0
10,000–25,000	40.2	22.9	26.8	31.5
25,000–50,000	47.5	28.6	33.6	35.7
50,000–100,000	48.0	20.0	34.0	38.0
More than 100,000	55.2	17.5	38.7	40.2
Major basins				
Northeast	11.9	10.9	10.3	26.8
North Atlantic	14.0	15.9	10.5	21.3
Southeast	29.5	26.8	12.2	43.0
Tennessee River	26.6	11.1	2.8	22.6
Ohio River	37.7	24.5	16.1	20.9
Lake Erie	44.9	29.7	27.8	23.4
Upper Mississippi	24.2	41.4	9.1	24.4
Western Great Lakes	28.7	16.0	14.5	20.7
Missouri River	29.6	28.5	10.0	9.0
Southwest-Lower Mississippi	26.8	27.9	13.6	17.7
Colorado River	11.5	1.3	5.8	1.3
Western Gulf	17.2	17.7	8.1	4.7
Pacific Northwest	8.0	1.8	4.3	5.0
California	12.7	11.9	6.9	18.6
Great Basin	7.0	3.5	3.5	3.5
Alaska				
Hawaii	8.7	8.7	4.3	4.3
Puerto Rico	51.6	3.2	1.6	51.6
Virgin Islands				
Total	24.1	22.1	11.1	21.1

Anthracite media in rapid type filters is reported in use at 330 plants serving in excess of 7,130,000 persons. Pennsylvania has the largest number of such installations among the States, followed closely by Iowa. The Upper Mississippi River Basin has the largest number of the anthracite rapid type filters among the major drainage basins.

Pressure rapid sand filters are found mostly (90 percent) in facilities serving communities of less than 5,000 population. Only in the group under 500 population, however, does the number of plants having pressure rapid sand filters exceed those having gravity rapid sand filters.

The Northeast Basin with 36, has the greatest number of slow sand filtration plants among the major drainage basins. The State of Massachusetts with 17 has the greatest number of such plants among the States, although Pennsylvania has the greatest population served, over 2,900,000.

Softening

Softened water is furnished to more than 17,679,000 persons from 956 plants. This is an increase of 112 percent in population served over 1948 although percentage wise the number of plants increased only by 23 percent. The chemical precipitation process of softening is the most common, being used in 56.5 percent of all such plants and serving almost 86 percent of the total population receiving softened water. Zeolite softening plants are more popular among the smaller communities and comprise about 56 percent of the total number of softening plants serving communities of less than 5,000 population.

In 1958 Ohio reported 193 softening plants. This represented 20 percent of the country's total for that year. Ohio also reported the largest population, over 3 million persons served by softened water. Only six States, the District of Columbia, Puerto Rico, and the Virgin Islands reported no softening plants.

Fifty percent of the plants having softening processes are located in the Ohio River and Upper Mississippi River Basins. Table 13 gives a clear picture of the distribution of water softening plants throughout the major drainage basins.

In table 29 data are given for number of softening plants reported for the years of 1941, 1944, 1948, and 1958 and by type of softening process in table 30. The continuing trend toward the increased use of the zeolite softening process is evident from the table. In 1940 zeolites were used in 31.1 percent of all softening plants while in 1958 they were used in over 43 percent of all softening plants. Jenkins, in his summary of the 1958 Inventory of Water Supply Facilities of 25,000 Population or More, lists only 12 plants using cation exchange (*11*), so it is reasonable to assume that the increase in softening plants using this process has been limited to the smaller communities.

Aeration

Aeration as a plant process is practiced in 2,195 plants. This is about 22 percent of all treatment facilities. These plants serve 19,800,000 persons. Table 28 shows the percentage of all treatment plants using this process. There is a wide range in practice of this process noted

Table 29. *Number of softening plants for the years 1941, 1944, 1948, and 1958—arranged by population groups*

Population groups	Number of softening plants			
	1941 [1]	1944 [2]	1948	1958
Less than 1,000	147	194	217	253
1,000–5,000	240	272	348	401
5,000–10,000	79	88	94	110
10,000–50,000	87	87	92	144
More than 50,000	23	24	28	48
Total	576	665	779	*956

[1] From Olson (9).
[2] From Olson (10).
*This figure does not include 75 plants classified as using "other methods—no lime" for softening.

Table 30. *Number of plants softening by chemical precipitation and zeolites for 1940, 1941, 1944, 1948, and 1958*

Year	Number of softening plants			Percent of total	
	Chemical	Zeolite	Total	Chemical precipitation	Zeolite
1940	377	170	547	68.9	31.1
1941	377	199	576	65.5	34.5
1944	427	238	665	64.2	35.8
1948	481	298	779	61.7	38.3
1958	540	416	956	56.5	43.5

among the different basins in the country. This range is from 41.4 percent in the Upper Mississippi Basin to a low of 1.3 percent in the Colorado River Basin.

Taste and Odor Control

Percentage data for taste and odor control measures are given in table 28. Over 11 percent of the treatment facilities in the United States reported taste and odor control practices which serve 33.1 percent of the population receiving treated water. The percentage of total plants using taste and odor control practices increases as the size of the community becomes larger. In the group over 100,000 population the percentage reaches a maximum of 38.7 percent. In the Lake Erie Basin 27.8 percent of all plants employ taste and odor control measures, while in the Tennessee River Basin only 2.8 percent of the plants use such processes.

Corrosion Control

In 1958 there were 2,089 facilities using corrosion control processes. As with taste and odor control, the use of these procedures increases in percentage of total plants as the size of the community increases. Corrosion control methods are used most frequently in the Southeast Drain-

age Basin (43.0 percent) and in Puerto Rico (51.6 percent), where about 50 percent of the treatment facilities have such processes. The use of these processes is very limited in the Colorado River, Western Gulf, Pacific Northwest, and Great Basins. Percentage data for population groups and major drainage basins are shown in table 28.

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